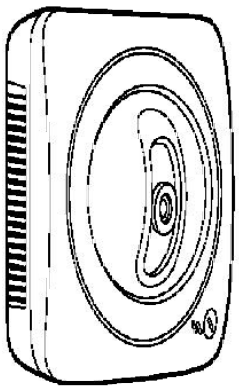
ORDER NO. KMS0507110CE

Service Manual

Network Camera

BB-HCM311CE / BB-HCM311E

(for Europe)



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IMPORTANT INFORMATION ABOUT LEAD FREE, (PbF), SOLDERING
If lead free solder was used in the manufacture of this product the printed circuit boards will be marked PbF.
Standard leaded, (Pb), solder can be used as usual on boards without the PbF mark.
When this mark does appear please read and follow the special instructions described in this manual on the use of PbF and how it might be permissible to use Pb solder during service and repair work.

1. ABOUT LEAD FREE SOLDER (PbF: Pb free)

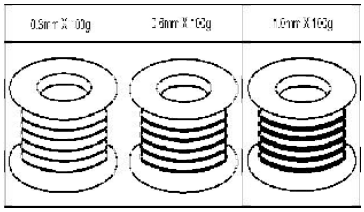
Note:
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.
We will use PbF solder when discussing the lead free solder used in our manufacturing process which is made from Tin, (Sn), Silver, (Ag), and Copper, (Cu).
This model, and others like it, manufactured using lead free solder will have PbF stamped on the PCB.
For service and repair work we suggest using the same type of solder although, with some precautions, standard Pb solder can also be used.

Caution

- **PbF solder has a melting point that is 50° ~ 70° F, (30° ~ 40°C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700° ± 20° F, (370° ± 10°C). In case of using high temperature soldering iron, please be careful not to heat too long.**
- **PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100°F, (600°C).**
- **If you must use Pb solder on a PCB manufactured using PbF solder, remove as much of the original PbF solder as possible and be sure that any remaining is melted prior to applying the Pb solder.**
- **When applying PbF solder to double layered boards, please check the component side for excess which may flow onto the opposite side (See figure, below).**

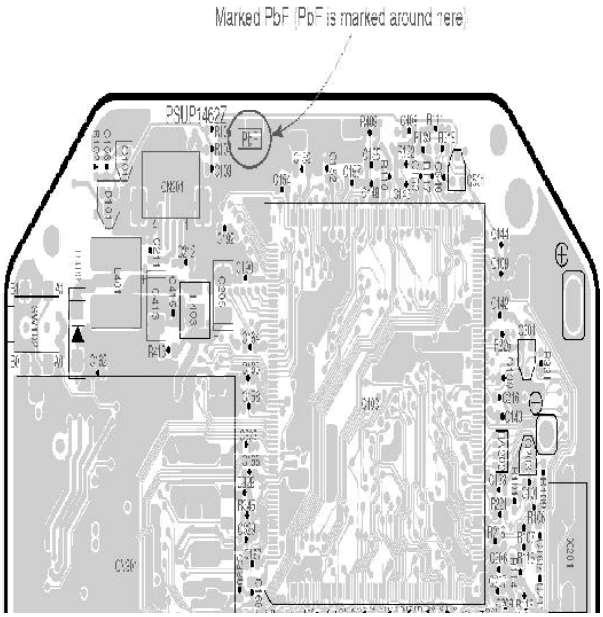
1.1. SUGGESTED PbF SOLDER

There are several types of PbF solder available commercially. While this product is manufactured using Tin, Silver, and Copper, (Sn+Ag+Cu), you can also use Tin and Copper, (Sn+Cu), or Tin, Zinc, and Bismuth, (Sn+Zn+Bi). Please check the manufacturer's specific instructions for the melting points of their products and any precautions for using their product with other materials. The following lead free (PbF) solder wire gauge are recommended for service of this product: 0.3mm, 0.6mm and 1.0mm.

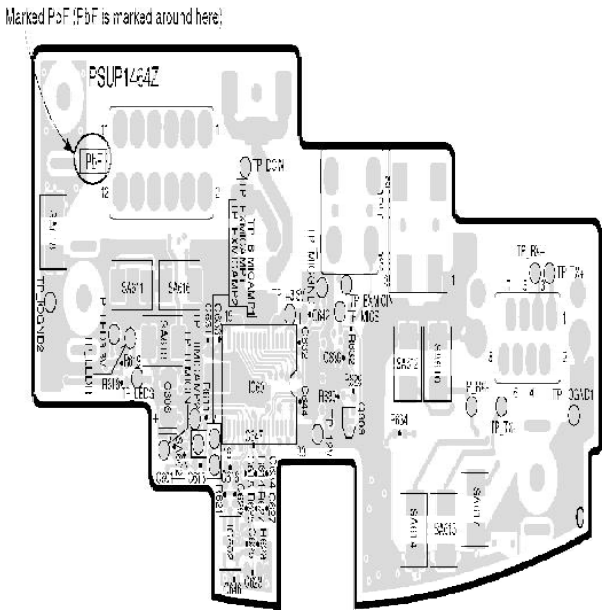


1.2. HOW TO RECOGNIZE THAT Pb FREE SOLDER IS USED

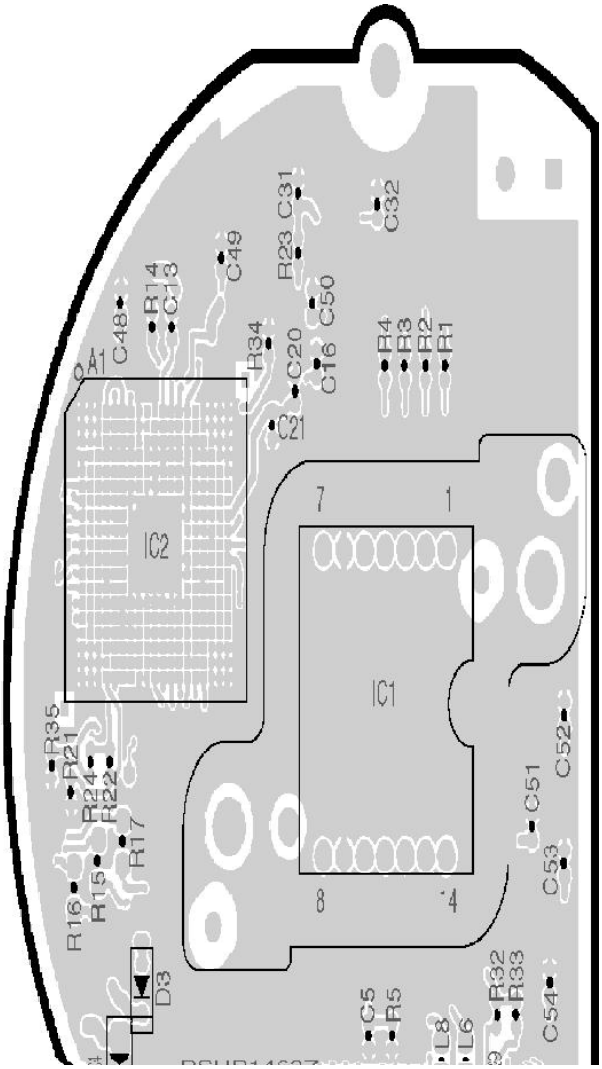
MAIN BOARD



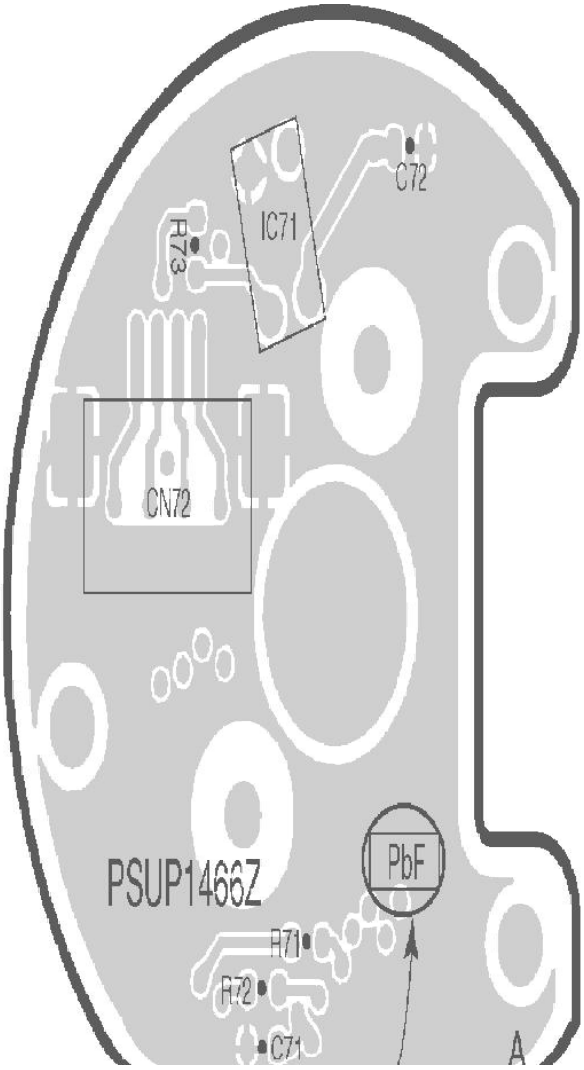
I/O BOARD



CAMERA BOARD



SENSOR BOARD



2. FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.
When replacing, the following precautions will help to prevent recurring malfunctions.

1. Cover the plastic parts with aluminum foil.

2. Ground the soldering irons.

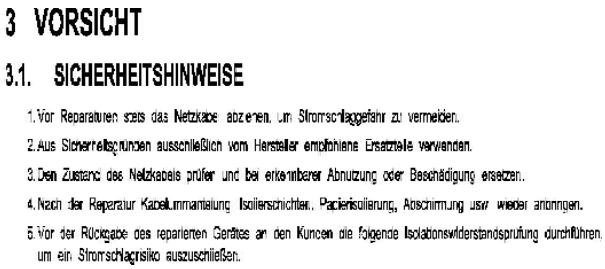
3. Use a conductive mat on the work-table.

4. Do not grasp IC or LSI pins with bare fingers.

3. CAUTION

3.1. SAFETY PRECAUTIONS

1. Before servicing, unplug the power cord to prevent an electrical shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, make the following insulation resistance test to prevent a shock hazard.



3 VORSICHT

3.1. SICHERHEITSHINWEISE

1. Vor Reparaturen stets das Netzkabel abziehen, um Stromschlaggefahr zu vermeiden.
2. Aus Sicherheitsgründen ausschließlich vom Hersteller empfohlene Ersatzteile verwenden.
3. Den Zustand des Netzkabels prüfen und bei erkennbarer Abnutzung oder Beschädigung ersetzen.
4. Nach der Reparatur Kabelummantelung, Isolierschichten, Papierisolierung, Abschirmung usw. wieder anbringen.
5. Vor der Rückgabe des reparierten Gerätes an den Kunden die folgende Isolationswiderstandsprüfung durchführen, um ein Stromschlagrisiko auszuschließen.

3.2. BATTERY CAUTION

Danger of explosion if the battery is replaced incorrectly. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's Instructions.
The lithium battery is a critical component (type No. CR2032/1VC1). Please observe for the proper polarity an the exact location when replacing it and soldering the replacement lithium battery in.

3.3. TRADEMARKS

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- SD mark is a trademark of the SD Card Association.
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3.4. INSULATION RESISTANCE TEST

1. Unplug the AC power cord and short the two prongs of the plug with a jumper wire.
2. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screw threads, etc.

Note:
Some exposed parts may be isolated from the chassis by design. These will read infinity.

3. If the measurement is outside the specified limits, there is a possibility of shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

3.4. ISOLATIONSWIDERSTANDSPRÜFUNG

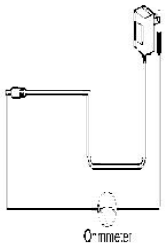
1. Das Netzkabel abziehen und die beiden Stifte des Steckers mit einer Drahtbrücke verbinden.

2. Mittels eines Ohmmeters den Widerstand zwischen dem überbrückten Netzstecker und allen freiliegenden Metallteilen des Gehäuses wie Schrauben, Gewinde, usw. messen.

Hinweis:

Einige der freiliegenden Teile können konstruktionsbedingt vom Gehäuse isoliert sein. Diese ergeben dann unendliche Messwerte.

3. Liegt der Messwert außerhalb der vorgegebenen Grenzen, besteht die Gefahr eines Stromschlags. Das Gerät muss vor der Rückgabe an den Kunden repariert und erneut geprüft werden.



Widerstand = über 6MΩ bei 500V DC

3.5. POWER CAUTION

The power socket wall outlet should be located near this equipment and be easily accessible.

3.5. SICHERHEITSHINWEISE ZUR STROMVERSORGUNG

Das Gerät in der Nähe einer leicht zugänglichen Wandsteckdose betreiben.

3.6. PRECAUTIONS FOR USERS IN THE UNITED KINGDOM

FOR YOUR SAFETY, PLEASE READ THE FOLLOWING TEXT CAREFULLY.
This appliance is supplied with a moulded three pin mains plug for your safety and convenience. A 3 amp fuse is fitted in this plug. Should the fuse need to be replaced, please ensure that the replacement fuse has a rating of 3 amps and that it is approved by ASTA or BSI to BS1362.

Check for the ASTA mark or the BSI mark on the body of the fuse.

If the plug contains a removable fuse cover, you must ensure that it is refitted when the fuse is replaced. If you lose the fuse cover, the plug must not be used until a replacement cover is obtained. A replacement fuse cover can be purchased from yourlocal Panasonic Dealer.
IF THE FITTED MOULDED PLUG IS UNSUITABLE FOR THE SOCKET OUTLET IN YOUR HOME THEN THE FUSE SHOULD BE REMOVED AND THE PLUG CUT OFF AND DISPOSED OF SAFELY. THERE IS A DANGER OF SEVERE ELECTRICAL SHOCK IF THE CUT OFF PLUG IS INSERTED INTO ANY 13 AMP SOCKET.
If a new plug is to be fitted, please observe the wiring code as shown below. If in any doubt, please consult a qualified electrician.
IMPORTANT: THIS APPLIANCE MUST BE EARTHED.
How to replace the fuse: The wires in this mains lead are coloured in accordance with the following code:

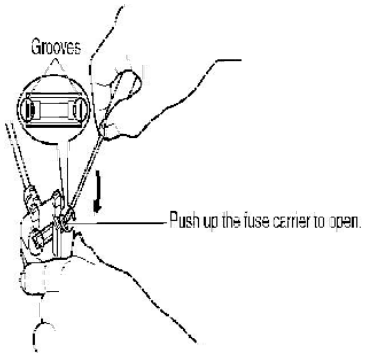
Blue: Neutral
Brown: Live

As the colours of the wire in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows.

The wire which is coloured BLUE must be connected to the terminal in the plug which is marked with the letter N or coloured BLACK.
The wire which is coloured BROWN must be connected to the terminal in the plug which is marked with the letter L or coloured RED.
Under no circumstances should either of these wires be connected to the earth terminal of the three pin plug, marked with the letter E or the Earth symbol ⏚.

How to Replace the Fuse

1. Insert the flathead screwdriver into the groove either end of the fuse carrier.



2. Detach the fuse carrier and change the fuse.

3. Replace the fuse into the fuse carrier and resecure into the mains plug.

3.7. CLEANING

After the camera is turned off by disconnecting the AC plug, clean the camera.

4. SPECIFICATIONS

Network Camera

Items	Specifications
Pan/Tilt Angle	Pan: -60° to +60°, Tilt: -45° to +20°
Number of Pixels	1/4-inch CCD Sensor 320,000 pixels
Illuminance	3-100,000 lx (0.2-100,000 lx in color night view mode)
White Balance	Auto/Manual/Hold
Focus	Fixed 0.5m (20 inches) - Infinity
Caliber Ratio (F No.)	F3.5
Horizontal Viewing Angle	53°
Exposure	Auto

Other Specifications

Items	Specifications
Video Compression	JPEG (3 Levels)
Video Resolution	640 x 480, 320 x 240 (default), 160 x 120
Buffered Image *1	About 125 frames (320 x 240) with time display (SD momory card is not inserted.)
Audio Communication	2-way Half Duplex
Audio Bandwidth	300 Hz-3.4 KHz
Audio Play Method	Play with ActiveX
Input Encoding Method	Encoding with ActiveX
Audio Input	Built-in Microphone or External Microphone Input Terminal
Audio Output *2	640 x 480, 320 x 240 (default), 160 x 120
Frame rate *3	Max.12 frames/second (640 x 480) Max.30 frames/second (320 x 240 or 160 x 120)
Supported Protocols	IPv4/IPv6 Dual-Stack -IPv4: TCP, UDP ,IP, HTTP, FTP, SMTP, DHCP, DNS, ARP, ICMP, POP3, NTP, IPsec, UPnP -IPv6: TCP, UDP, IP, HTTP, FTP, SMTP, DNS, ICMPv6, POP3, NDP, NTP, IPsec
IPsec Feature	ESP Encryption, ESP Authentication Transport mode (Main mode only)/T nnel mode IKE (Internet Key Exchange)
IPsec Authentication Method	Pre-Shared Key
Cipher Algorithm	DES-CBC, 3DES-CBC, AES-CBC
Message-Digest Algorithm	HMAC-MD5, HMAC-SHA-1
Message Transfer Condition	Alarm or Timer
Image Transfer Method	SMTP, FTP
Interface	10Base-T/100Base-TX Ethernet RJ-45 connector x 1
Indicator Display	Power/Network Communication/Camera operation/Ethernet link
External Microphone Input	3.5 mm Mini Jack
Audio Output	3.5 mm Stereo Mini Jack (But outp t is mono.)

Items	Specifications
External I/O	External Sensor Input x 2 External Sensor Output x 1
SD Memory Card Slot	Full Size
Dimension (HWD)	About 100 mm (3.94 inches) x About 100 mm (3.94 inches) x About 73.5 mm (2.89 inches)
Weight	310 g (Only the unit)
Power Supply	AC adaptor: Input 100-240 V AC, 50/ 60 Hz Output 12 V DC, 750 mA Consumption: About 3 W (6 W during pan/tilt scan)
Temperature	Operation: 0 °C (+32 °F) to +40 °C (+104 °F) Storage: +0 °C (+32 °F) to +50 °C (+122 °F)
Humidity	Operation: 20%-80% (No Condensation) Storage: 20%-90% (No Condensation)

***1) The maximum number of frames changes depending on the image quality and what object you buffer.**
***2) Connect it to an amplifier or an external speaker with a built-in amplifier.**
***3) Frame rate may slow down depending on the network environment, the PC performance, the image quality, enabling IPsec, SD memory recording or what object you view.**

5. MAIN FEATURES

IPv6*1 Network Camera
Yo r Panasonic Network Camera supports IPv6 (Internet Protocol Version 6), IPv6 was created to address the additional IP addresses that will be needed as the Internet continues to expand.Since the camera also supports IPv4 that's currently used, it is "dual stack" design will seamlessly operate while IPv6 is phased in. For more information in IPv6 you wish to visit http://www.ipv6.org/.

Audio 2-way Communication*2 (Walkie-talkie Type)
Your Panasonic Network Camera now provides 2-way audio, between the camera and your PC. You will be able to hear the person on camera and respond using a microphone connected to your PC's sound card (customer-provided.) They will hear your response through the amplified speaker (customer-provided) connected to the camera.
For example, the camera can be used in the following various locations:

- In the baby's room, to hear if the baby is crying.
- At the front door, to see and hear who is at the door.
- In the children's play room, to see and hear if they are safe.

Note:
PLEASE NOTE that nder certain circumstances, audio/video recording may be PROHIBITED by law. This device should be used only in compliance with all applicable federal, state and local statutes.

Better Image Quality

The CCD sensor and the color night view mode provides better image quality and low light performance.

- The CCD sensor gives you clear image.
- You can monitor live video (Motion JPEG) that refreshes its image 30 frames per second.
- Color night view mode allows you to monitor the camera in low illuminance.

Various Camera Control Features

The camera pans or tilts fast in maxim m 80° per second. (The previous model: 21° per second) You can control the camera at high speed from your PC or mobile phone. Alarm position feature also allows the camera to a tomatically turn the lens to the alarm position. Additionally, the following control features are available to easily and quickly monitor the camera.

Click to Center...When yo click a certain point on the camera image, the point is centered on the image.

Preset Position...You can register 8 preset positions.When yo click each button, the image switches to its position.

Output Control...You can control the external devices (Open or Short to GND)(E.g., turning the light on or ringing a buzzer).

SD Memory Card*3 Recording

The camera has an SD memory card slot. You can record camera images to the SD memory card. If you enable alarm buffer/transfer, you can record the image at the timing of signal detection of door sensor or light.About 58,000 images (320 x 240 resolution and standard quality) can be recorded to 1 GB SD memory card. If you enable 1-minute interval timer buffer/transfer, you can record the images for about 42 days.

Enhanced Multi-Camera Page

Multi-Camera page displays up to 4 cameras while supporting each audio 2-way communication. The previous model displays only 4 cameras, but this camera can switch 3 sets of 4 cameras.Additionally, the camera can displays maximum 12 cameras on a page in a static image.

Supporting Viewnetcam.com service

Viewnetcam.com service allows you to access the camera over the Internet with your favorite domain name (E.g., bob.viewnetcam.com) instead of a global IP address.

Multi-Language Display

Top page,Single Camera and Multi-Camera page can be displayed in English, French, German, Italian, Spanish, Russian, Simplified Chinese or Japanese. The Setup, Maintenance and Support pages are displayed only in English or Japanese.

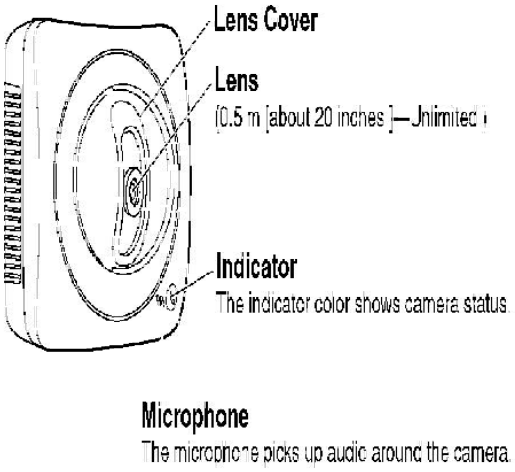
***1 To connect in IPv6, subscribe to the ISP's "IPv4/IPv6 Dual-Stack" or "IPv6 over IPv4 Tunneling" service. The camera does not work in IPv6-only network.**

***2 Audio feature does not work on mobile phones. Talk button and Listen button cannot be used sim ltaneously. In IPv6, the audio feature does not work. It will be supported by the firmware update in the**

future. In consequence of traffic and network environments, the audio may be delayed or may break up.
***3 SD memory card is sold separately. The camera supports 64 MB, 128 MB, 256 MB, 512 MB or 1 GB SD memory card.**

6. PARTS LOCATIONS

6.1. FRONT VIEW

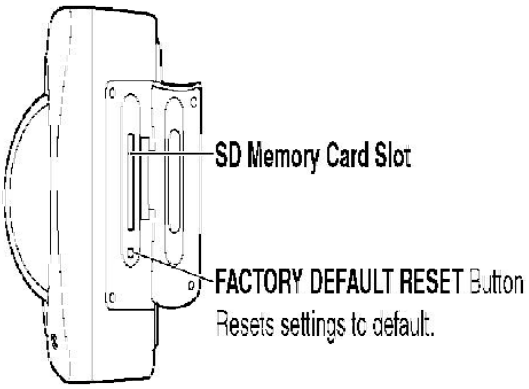


Indicator Display

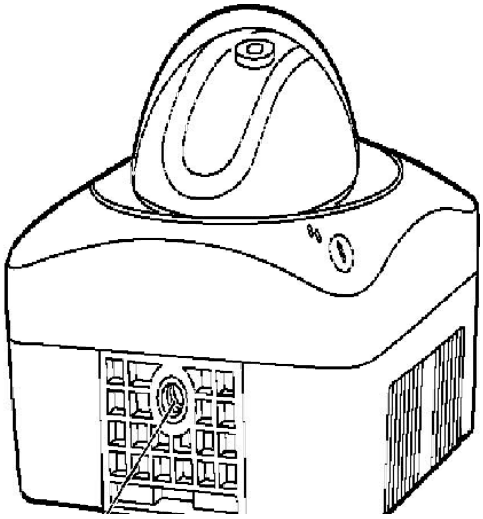
Power on	**Not on the LAN**	**Orange → Orange blinking**
	On the LAN	**Orange → Orange and green blinking → Green**
Normal Operation *1		**Green**
Automatic Setup	**Setting**	**Green blinking**
	Finished seting	**Green**
Using DHCP	**Getting IP address *2**	**Green blinking**
	Got IP address	**Green**
Updating Firmware		**Orange blinking**
Pressing FACTORY DEFAULT RESET button		**Orange blinking Turning off (The camera restarts after that.)**
UPnP Failure		**Orange blinking (About a 2-second interval)**
Internal Failure		**Red blinking**

***1) The indicator turns orange if the camera is not connected to the LAN.**
***2) The indicator blinks orange if the camera is not connected to the LAN.**

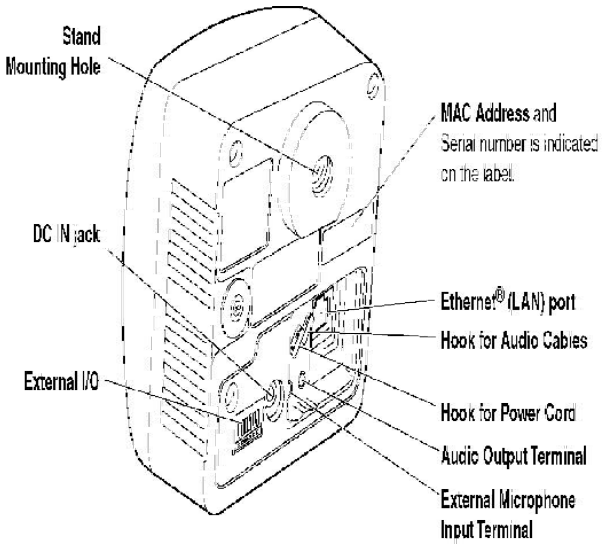
6.2. SIDE VIEW



6.3. BOTTOM VIEW



6.4. REAR VIEW



Note:
To listen to audio from the camera, an external amplified speaker (customer-provided) must be connected to the camera. The connector used is a stereo type, similar to that used by amplified PC speakers. Though the connector is stereo, the audio is not.

7. CONNECTING YOUR NETWORK CAMERA

7.1. PREPARATION

Prepare the following before connecting the Network Camera.

- Set up software (Setup CD-ROM)
- PC to fulfill the system requirements.
- Ethernet Router for LAN Connection.
- Ethernet cable (two pieces of Category 5 straight cable).

System Requirements
Your PC (Personal Computer) and network must meet the following technical specifications for the camera to work properly.

Item	Description
Operation System	Microsoft ® Windows ® XP Microsoft ® Windows ® 2000 Microsoft ® Windows ® Me Microsoft ® Windows ® 98SE
CPU	-For viewing single camera Pentium ® III (800 MHz or greater is recommended.) -For viewing multiple cameras Pentium ® 4 (1.8 GHz or greater is recommended.)
Protocol	TCP/IP protocol (HTTP, TCP, UDP, IP, DNS, ARP, ICMP)
Interface	10/100 Mbps network card installed
Web Browser	Internet Explorer 6.0 or later (Not included on the Setup CD-ROM)
Audio	Audio input/output feature (Microphone or speaker) Java ™ 1.4.2_04

For IPv6 Connection

Item	Description
Operation System	Microsoft ® Windows ® XP Service Pack 1 or later
CPU	-For viewing single camera Pentium ® III (800 MHz or greater is recommended.) -For viewing multiple cameras Pentium ® 4 (1.8 GHz or greater is recommended.)
Protocol	TCP/IP protocol (HTTP, TCP, UDP, IP, DNS, ICMPPv6, NDP)
Interface	10/100 Mbps network card installed
Web Browser	Internet Explorer 6.0 or later (Not included on the Setup CD-ROM)

Note:

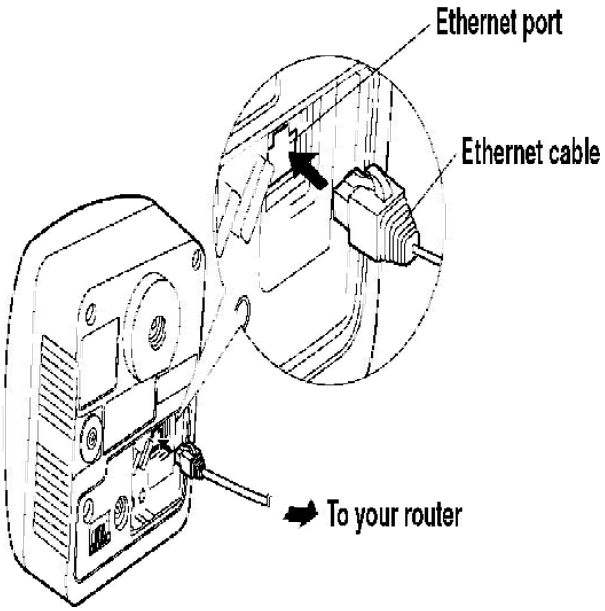
- Audio feature works only with IPv4 connection.

- See Panasonic Network Camera support website at http:// panasonic.co.jp/pcc/products/en/netwkcam/ for details about network environment.

7.2. CONNECT THE CAMERA TO YOUR ROUTER

Connect the camera to your router with an Ethernet cable to set up the camera.

1. Connect the Ethernet cable (customer-provided) to the camera.



Note:

- These instructions assume your PC is already connected to the Internet and your network includes a router.

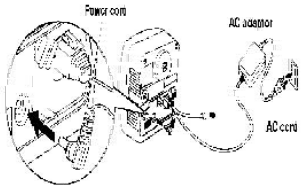
- The camera will be connected to your router using a "straight" Cat5 network cable (customer-provided).

2. Connect the Ethernet cable to your router.

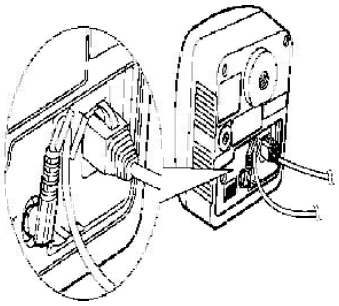
3. Connect the power cord of the AC adaptor to the DC In jack, and plug

the AC cord into the outlet.

- When you operate the camera, the outlet should be near the camera and easily accessible.
- Use only specified Panasonic AC adaptor PQLV202 (Order No. PQLV202Y).
- If the indicator does not light green,see Operating Instruction.
- A noise can be heard during pan/tilt operation. This is normal.



4. Hook the power cord to the Hook for Power Cord.



7.3. SETTING UP THE CAMERA TO VIEW ON THE LAN

Setup CD-ROM allows you to easily set up the camera.

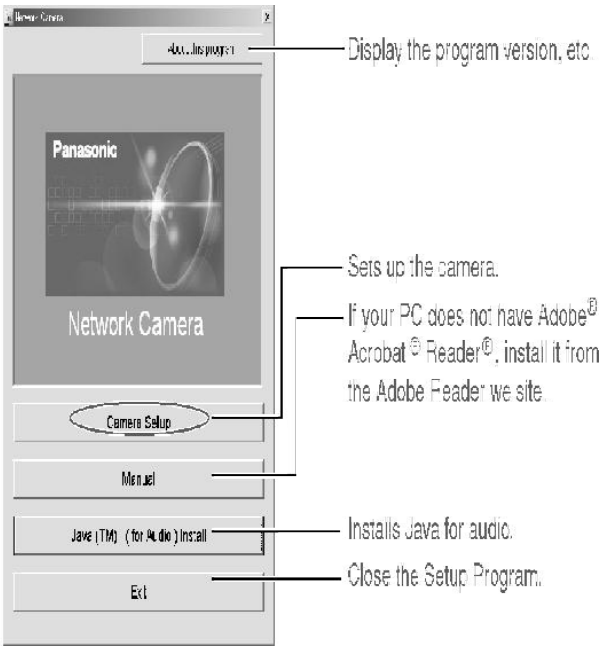
Note:

- To avoid any possi le problems, temporarily disa le any firewall or antivirus software.
- This procedure explains installation of the camera on the same network that your PC is part of.
- Before proceeding,close your we browser.
- See Operating Instructions on the Setup CD-ROM for details.

1. Insert the Setup CD-ROM into the CD-ROM drive of the PC.

- The window is automatically displayed.
  (If the Network Camera Setup window is not displayed automatically, double-click "Setup.exe" file on the Setup CD-ROM.)

2. Click [Camera Setup].


Panasonic
Network Camera
Camera Setup
Manual
Java (TM) (for Audio) Install
Exit
Display the program version, etc.
Sets up the camera.
If your PC does not have Adobe® Acrobat® Reader®, install it from the Adobe Reader we site.
Installs Java for audio.
Close the Setup Program.

3. Select the camera to set up and click [Execute].

- This program searches for the cameras that are connected to the router and displays the MAC Addresses, IP addresses and Port Numbers.

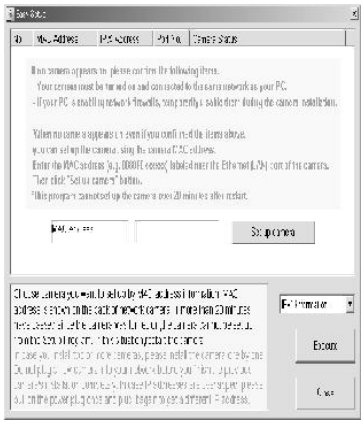
- The MAC Address on the rear side of the camera shows which camera you select on the Camera List window.

Note:

- If more than 20 minutes have passed since the camera was turned on, the camera cannot be set up from the Setup Program. In this situation,

disconnect the power cord from the outlet, and reconnect it again.

- The Setup Program may not list any cameras due to your firewall or antivirus software settings on your PC. If you cannot disable your firewall or antivirus software, you can set up the camera entering the camera MAC address on the following window. The camera's MAC address can be found on the label affixed to the back of each camera.

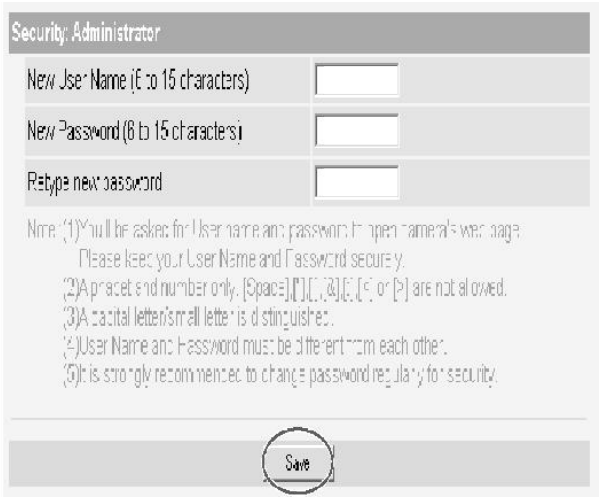


4. Click [Automatic Setup (Local Access Only)].

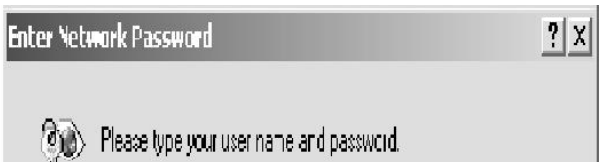
- For the first time installation or after pressing the FACTORY DEFAULT RESET button, only [Automatic Setup (Local Access Only)] can be selected. To set up the camera with Static or DHCP settings, after

performing the [Automatic Setup (Local Access Only)], run the Setup Program again and select [Manual Setup].

5. Enter the user name and password you wish to use, and click [Save].



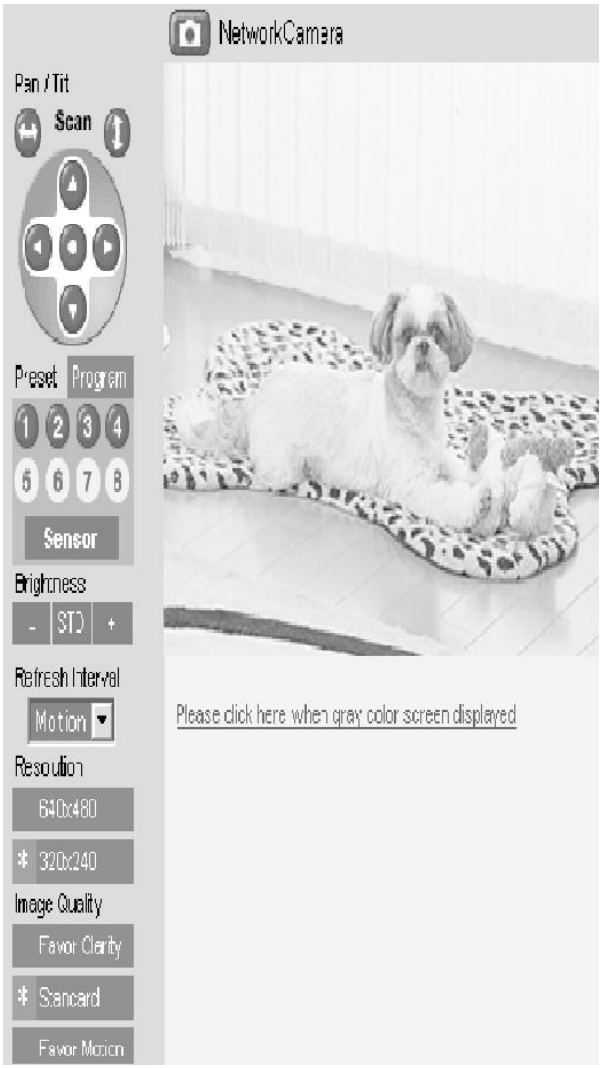
6. Enter the name and password that were entered a ove, and click [OK].



7. When the Single Camera page is displayed,the setup is completed.

- When Security Warning window is displayed, click [Yes].

- When Warning -Security window is displayed, click [Always]



Note:
To insure that the most current image is displayed,I nternet Explorer should be configured as follows.This will not have any negative result on normal use.

1. **While viewing any website, Click [Tools] [Internet Options].**
2. **In the section "Temporary Internet Files", click [Settings] and check [Every visit to the page].**

7.4. LISTENING TO CAMERA AUDIO - TALKING TO THE CAMERA

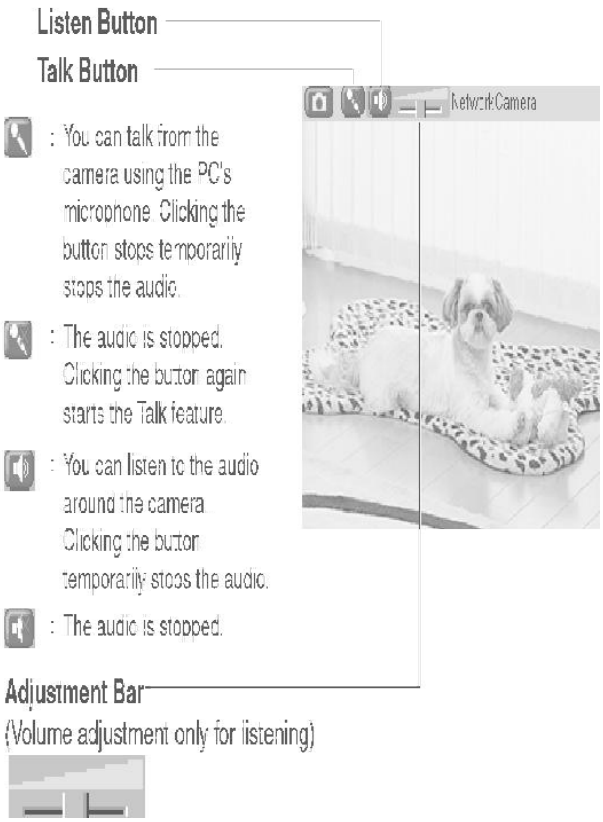
1. **Access the camera.**

   - The Top page is displayed.

2. **Click the [Single] tab at the top of the page.**

3. The audio control bar is displayed at the top of the screen. Listening or Talking is selected using the 2 icons. For general sers, the feature m st be enabled, otherwise it will not be displayed.

Audio Feature


Listen Button
Talk Button
: You can talk from the camera using the PC's microphone. Clicking the button stops temporarily stops the audio.
: The audio is stopped. Clicking the button again starts the Talk feature.
: You can listen to the audio around the camera. Clicking the button temporarily stops the audio.
: The audio is stopped.
Adjustment Bar
(Volume adjustment only for listening)

Note:

- Talk button and Listen button cannot be used simultaneously. Talk feature is stopped during listening. Talk feature can be used only for a user. Listen feature can be sed for maximum 10 users. If the audio is interrupted, reduce the max.bandwidth. In this case, the number of users for listening are reduced.

- Audio features such as camera microphone sensitivity and mute during pan/tilt can be set up on the Audio page.

- If you are running other applications or opening multiple windows, the audio may be interrupted or delayed.

- When the image is refreshed during any operation such as preset registration or a web browser refresh, the volume is reset to the defa lt

(midrange) position. Audio that was muted is enabled.

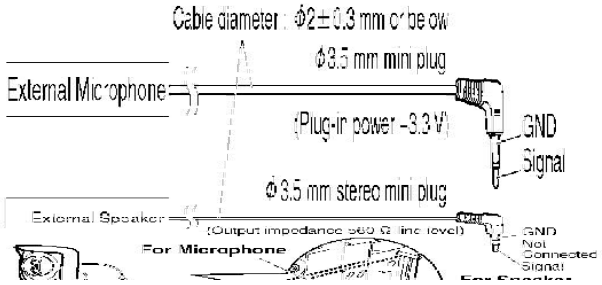
- The audio may be interrupted due to your PC's performance or network environment. Reduce the max.bandwidth.

- If the camera is accessed while the PC user visits other websites, the active microphone may pick up audio from the PC's speakers. Be careful with it.

- If you cannot listen to the audio or talk from your PC, see 2.5 Audio Problems in the Troubleshooting section of the Installation/ Troubleshooting.

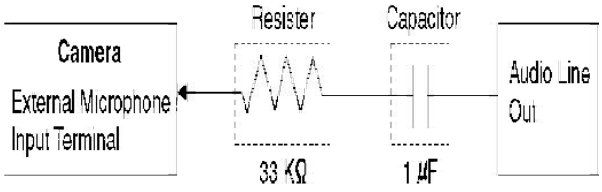
- Excessive length or poor quality microphone cable can cause a degradation in audio quality.

- To talk to the camera from your PC, an external amplified speaker s ch as the Panasonic RP-SPT70 or equivalent (customer-provided) must be connected to the camera. The speaker connects to the camera with a stereo audio cable similar to that used by your PC. Though the connector is stereo, the audio is not.



- The cables for the external microphone and external speaker must be shielded, and less than 3 m long. Using nonstandard cables may cause sound interference due to strong radio waves.

- The external microphone input terminal does not correspond to an line level. Audio may be distorted when the line level is input.Audio distortion will be solved if you insert the following circuits. Under no circumstance should high level audio, such as from a speaker, be connected to this input terminal. Doing so is likely to damage the camera.



8. DISASSEMBLY INSTRUCTIONS

8.1. HOW TO REMOVE MAIN BOARD AND I/O BOARD

MAC address label caution
When you replace the main board, you must also attach the new MAC address label(included with the main board). Attach the new MAC address label to the unit by placing over the old MAC address label. Make sure the old address cannot be seen.
Throw away the old main board. It cannot be reused.
(If the MACaddress of the old main board is already registered via DDNS and thenused in a different camera, the camera cannot be used with DDNS service.)

1. Remove four Screws (B). **2. Remove Cabinet Cover.**	

3. Remove three Screws (A). **4. Remove Main Board and I/O Board from Cabinet Body.** **5. Remove Connector A, Connector B and Connector C.**	
6. Remove FFC Cable from Main Board and I/O Board.	

8.2. HOW TO REMOVE LENS UNIT AND SENSOR BOARD

1. Remove four Screws (B). **2. Remove Cabinet Cover.**	
3. Remove three Screws (A). **4. Remove Main Board and I/O Board from Cabinet Body.** **5. Remove Connector A, Connector B and Connector C.**	

6. Remove two Screws (A). **7. Remove Pan Motor Unit, Pan Gear and Eye Block from Cabinet Body.**	
8. Remove four Screws (D). **9. Remove Tilt Motor Unit.**	
10. Remove two Screws (D). **11. Remove Eye Left Cover, Lens Block and Eye Center Cover from Eye Right Cover.**	

12. Remove two screws (D). **13. Remove Lens Unit from Lens Cover.**	
14. Remove FPC Tape and CORE Tape from Eye Right Cover.	

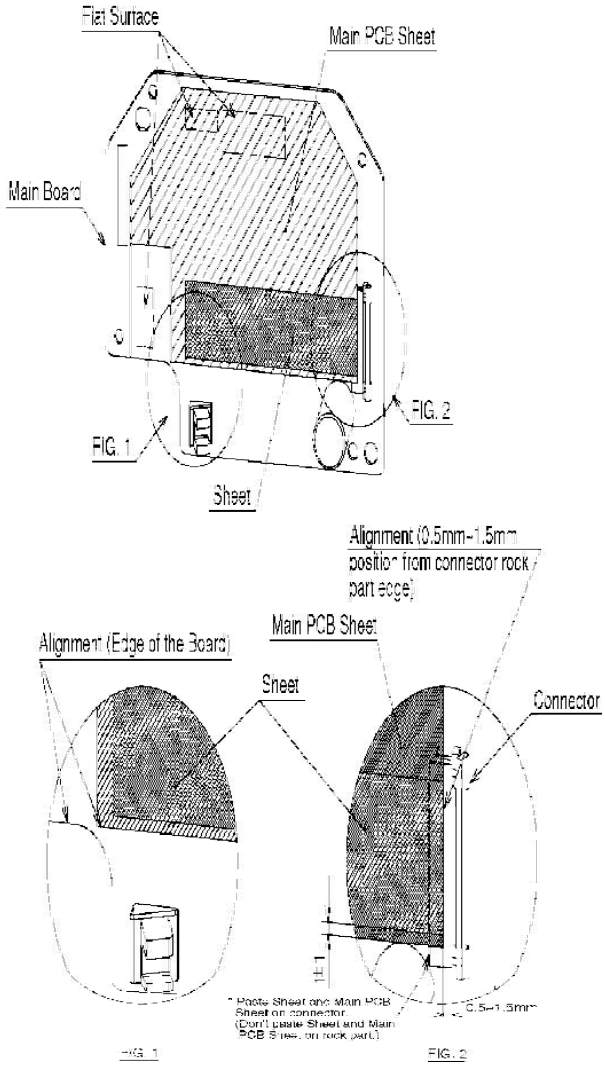
15. Pull Connector B and remove Tilt Motor Unit.	
16. Remove two Screws (D). **17. Remove Sensor Board and Filter from Eye Right Cover.**	

18. Remove Sensor Board from FPC Cable.	

9. THE CAUTIONS AT THE TIME OF ASSEMBLY

9.1. CAUTIONS FOR SHEET ATTACHMENT

Attach the Main PCB Sheet to the Main Board and then attach the Plastic Parts to it.



Caution:

See the Figures for the position in the attachment of the Main PCB Sheet and the Sheet.

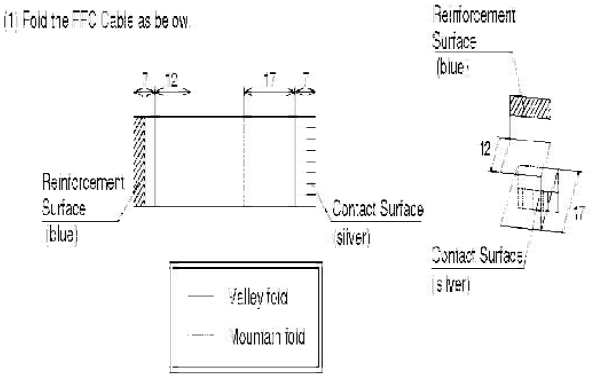
Press the Flat Surface shown in the Figure, then press the whole sheet securely to avoid peeling.

The Sheet should not cover the connector in FIG. 2.

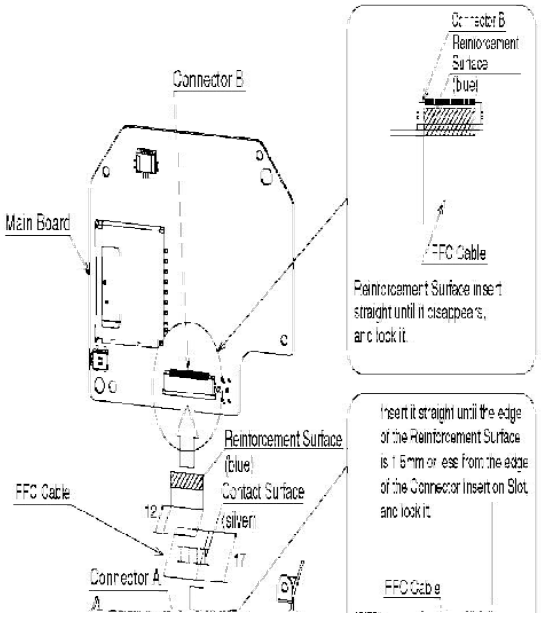
9.2. CAUTIONS FOR FFC CABLE ATTACHMENT

Process the FFC Cable to insert to the connectors of the I/O Board and the Main Board.

(1) Fold the FFC Cable as be ow.

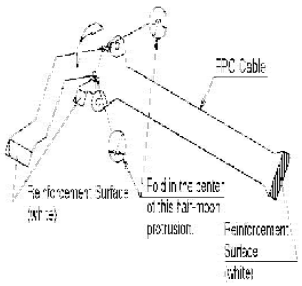


(2) Insert the processed Lead Wire into Connector A of the I/O Board and Connector B of the Main Board.



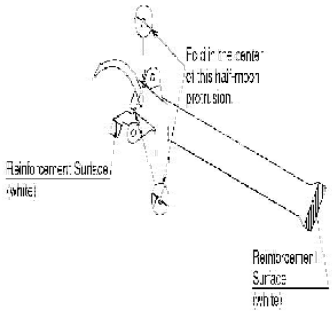
9.3. CAUTIONS FOR FPC ATTACHMENT

1. Fold the FPC Cable in the direction of the arrow in the position of the half-moon top protrusion (chain line) as shown below.

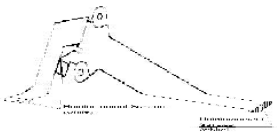


Caution:
When folding the FPC, be careful not to damage it.

2. Fold back the FPC Cable in the direction of the arrow in the position of the half-moon top protrusion (chain line) as shown below.

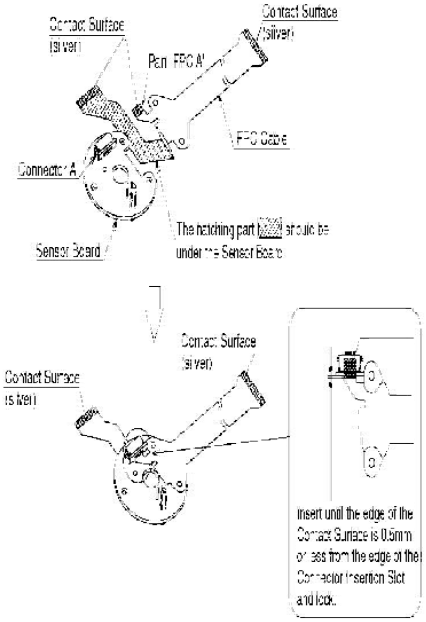


3. Completion of folding.

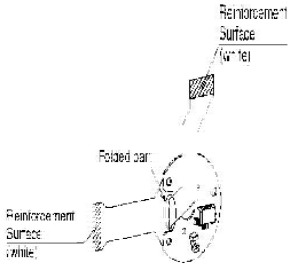


4. Attach the FPC Cable to the Sensor Board.

(1) Insert Part FPC A of the FPC Cable into Connector A of the Sensor Board and lock it.

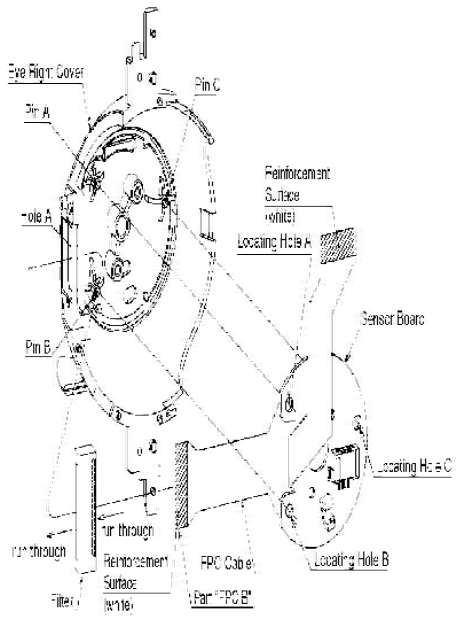


(2) Arrange the form of the folded part of the FPC Cable as shown below.



5. Attach the Sensor Board to the Eye Right Cover and fix it with the Screw (D).

(1) Put Part "FPC B" of the FPC Cable through the Filter and Hole A of the Eye Right Cover from inside.
Align the Locating Holes of the Lead Wire and Locating Holes A and B of the Sensor Board put each locating pin



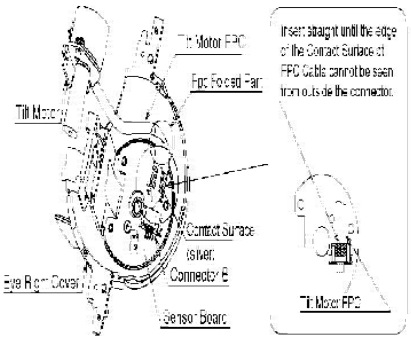
Caution:

Make sure that the Locating Holes (2 places) of FPC Cable and Locating Holes A and B (2 places) of Sensor Board are overlapped and put into Pin A and B of the Eye Right.

(2) Once the confirmations are determined, fix the Sensor Board with the Screws (C).

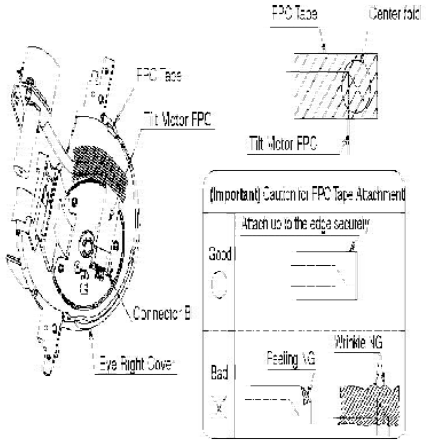
9.4. CAUTIONS FOR PAN MOTOR UNIT ATTACHMENT

1. Insert the Tilt Motor FPC of the Tilt Motor into Connector B of the Sensor Board.


Tilt Motor FPC
Fpc Fixed Part
Tilt Motor
Insert straight until the edge of the Contact Surface of FPC Cable cannot be seen from outside the connector.
Contact Surface
(silver)
Connector B
Eye Right Cover
Sensor Board
Tilt Motor FPC

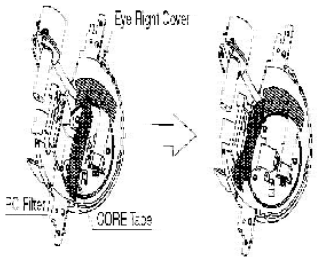
Caution:
Before inserting the FPC into the connector, check the folded part.

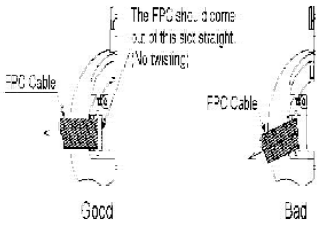
2. Attach the Tilt Motor FPC of the Tilt Motor using the FPC Tape on the inside of the Eye Right Cover.

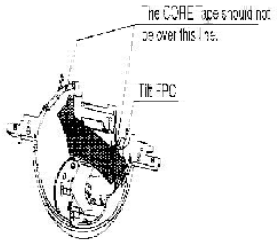


Caution:
At the attachment, the folding center of the Tilt Motor FPC should be to the right of the center of the FPC Tape.
Make sure that the Tilt Motor FPC is not removed from the connector.

3. Attach the FPC Filter using the CORE Tape to the inside of the Eye Right Cover.





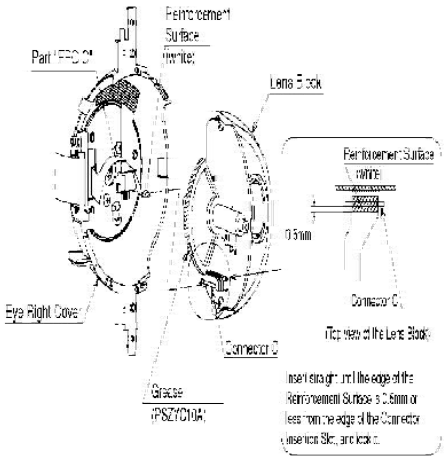


Caution:
When the CORE Tape is attached, it should be attached carefully so as not to be out of the line of the Eye Right Cover.

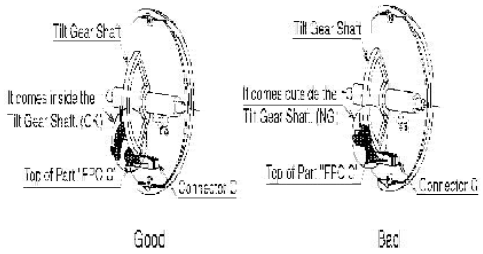
9.5. CAUTIONS FOR CAMERA BOARD ATTACHMENT

1. Attach the Lens Block to the Eye Right Cover.

(1) Form Part "FPC C" of the FPC Cable as shown below, insert it into Connector C of the Lens Block and lock it.



(2) Attach the top of Part "FPC C" between the Tilt Gear Shaft and the Lens Block as shown below so that it does not come outside the shaft.

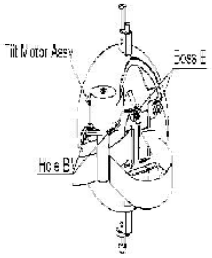


Caution:
Do not touch the lens during attachment of the Lens Block.

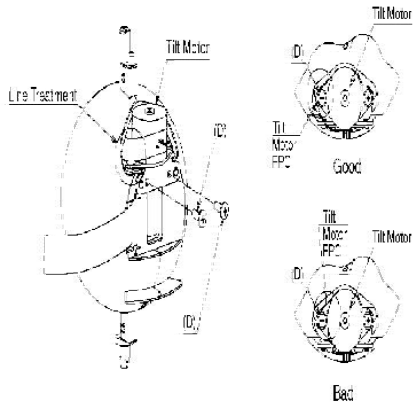
9.6. CAUTIONS FOR TILT MOTOR ATTACHMENT

Attach the Tilt Motor and fix it with the Screws (D).

(1) Turn the Tilt Motor 90 degrees to align the positions of Hole B and Boss B, and attach it.



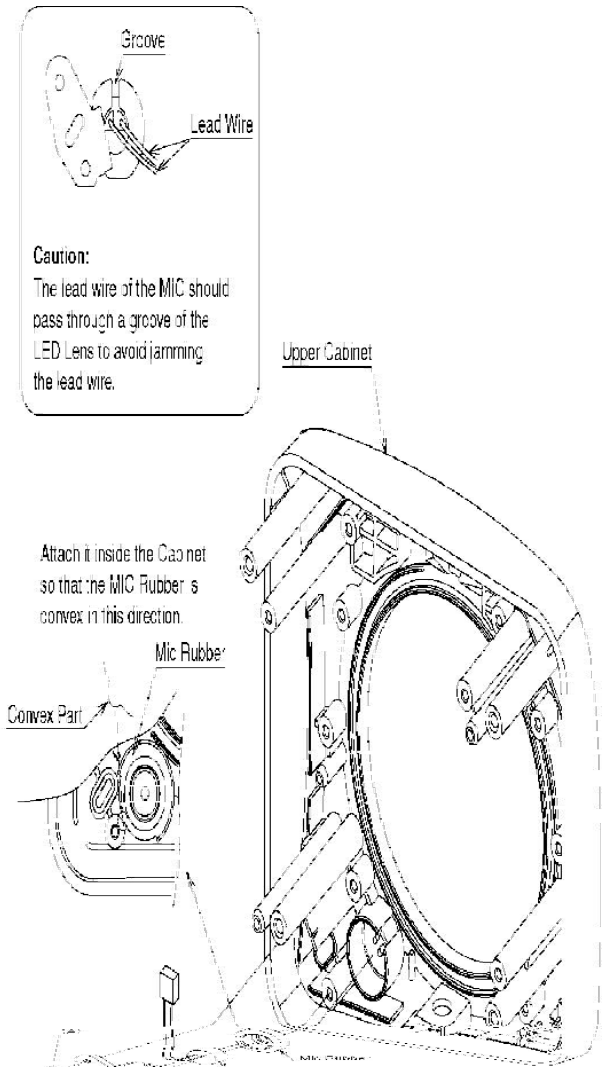
(2) Fix Tilt Motor with the Screws (D).



Caution:
The line treatment of the Tilt Motor FPC of Tilt Motor should not enter the space between the Tilt Motor and the Screws (D).

9.7. CAUTIONS FOR MIC ATTACHMENT

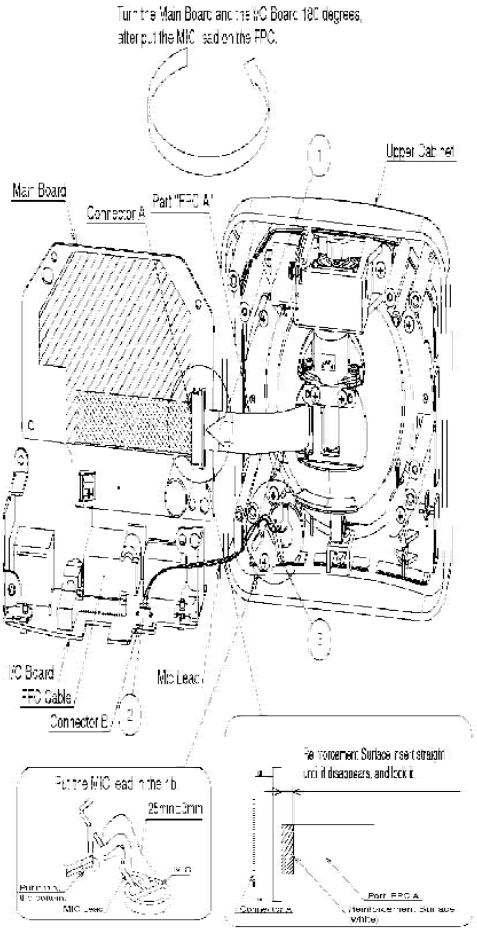
Insert the MIC Rubber, the MIC and the LED Lens into the Upper Cabinet and fix them with the Screws (A).


Groove
Lead Wire
Caution:
The lead wire of the MIC should pass through a groove of the LED Lens to avoid jamming the lead wire.
Upper Cabinet
Attach it inside the Cabinet so that the MIC Rubber is convex in this direction.
Mic Rubber
Convex Part

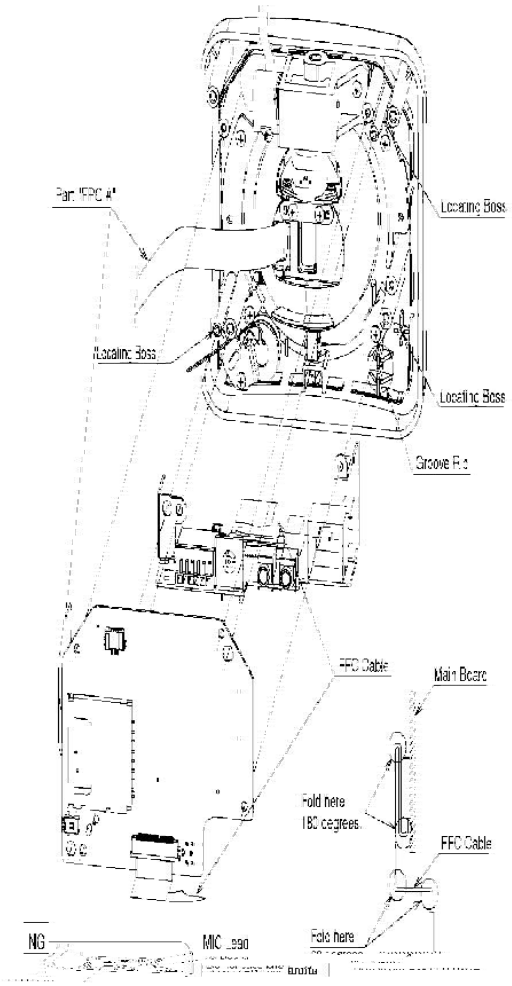
9.8. CAUTIONS FOR MAIN BOARD ATTACHMENT

Attach the component that connects the Main Board and the I/O Board with the FFC Cable, to the Upper Cabinet and fix it with the Screw (A).

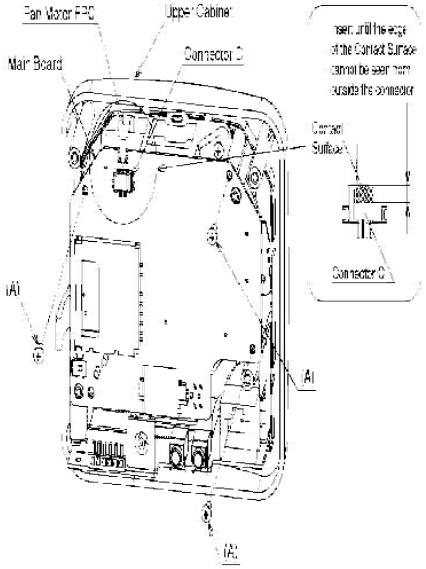
(1) ① Insert Part "FPC A" to Connector A of the component that connects the Main Board and the I/O Board with the FPC Cable and lock it.
② Connect the MIC lead to Connector B of the Board.
③ Put the MIC lead in the hole and turn the Main Board and the I/O Board 180 degrees.



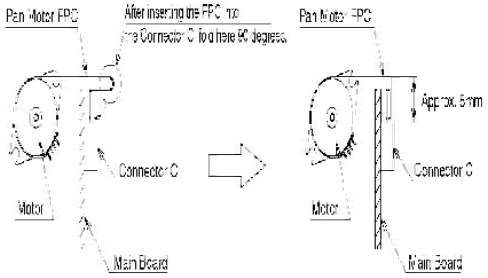
(2) Align the MC Board with the groove rib and locating bosses of the Upper Cabinet and the holes of the Main Board with its bosses.



(3) Fix the Main Board to the Upper Cabinet with the Screws (A)
(4) Fix the Pan Motor FPC to Connector C



Caution:
How to process the Pan Motor FPC



9.9. CAUTIONS FOR PLASTIC PATS ATTACHMENT

Attach the Sheet to the Cabinet Cover mount the Cabinet Cover on the Upper Cabinet, and fix it with the Screws (B).

(1) Attach the Sheet inside the Cabinet Cover.

Notes: 1) Attach it from the bottom side as shown below.

2) Only the ends of the Sheet have adhesive, press them securely at attachment.

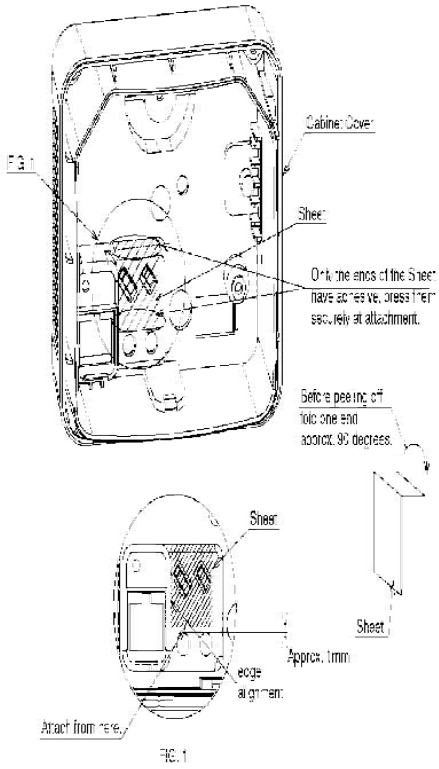
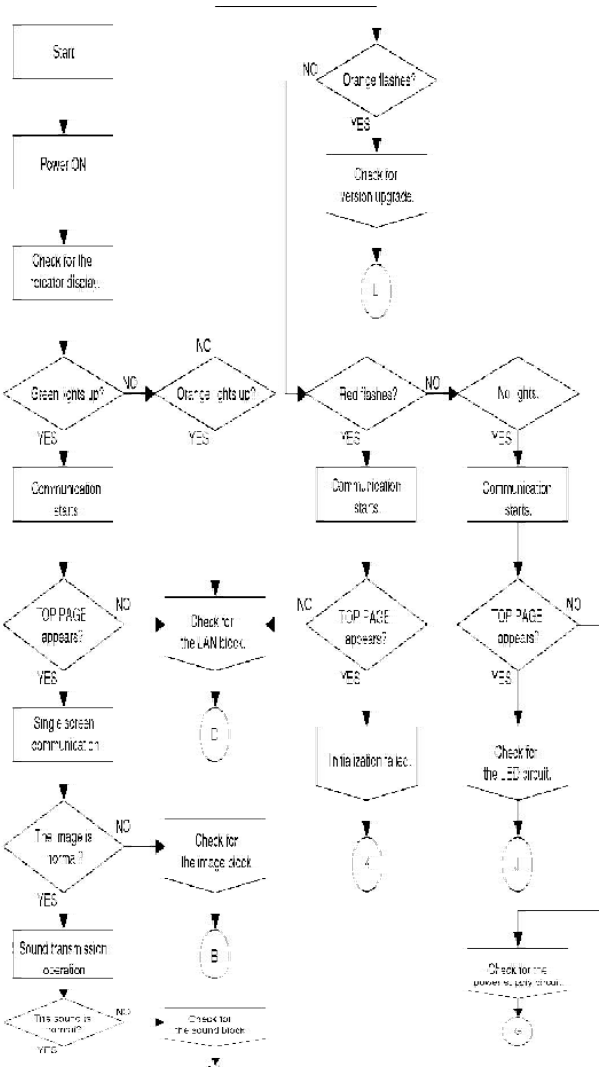


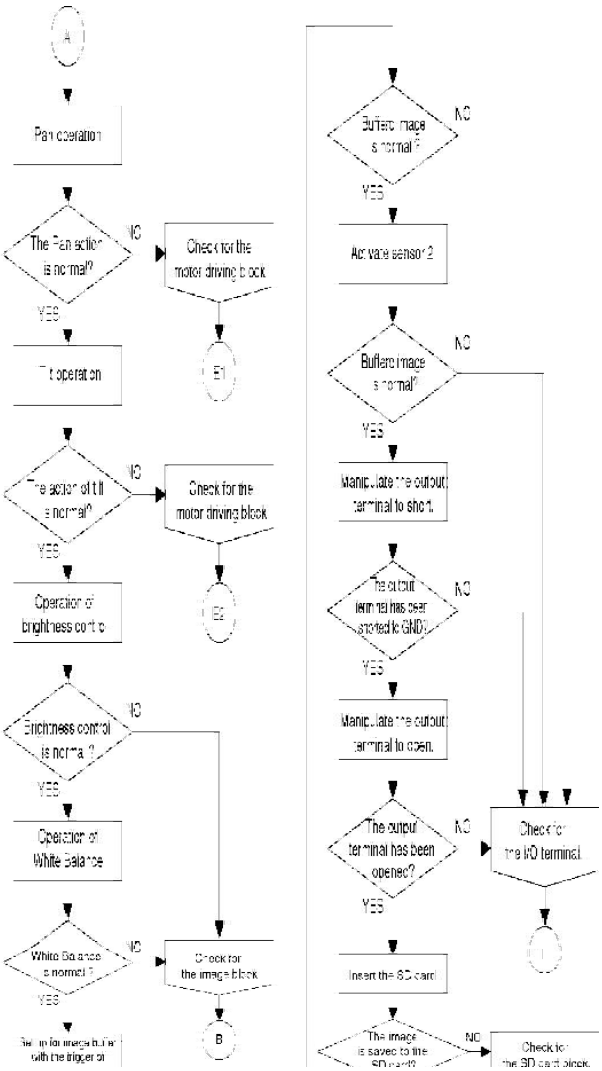
FIG. 1

10. TROUBLE SHOUTING

10.1. BASIC OPERATION

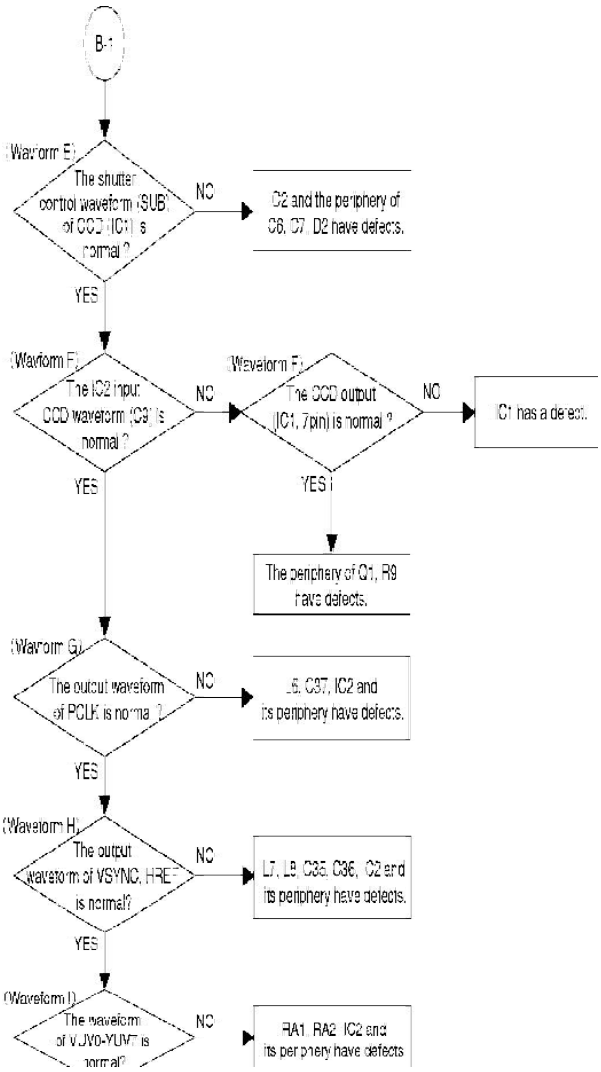


10.2. CHECK FOR OTHER FUNCTION

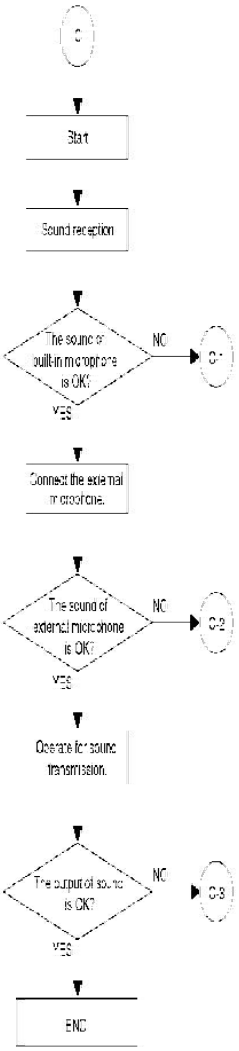


10.3. CHECK FOR SCREEN BLOCK

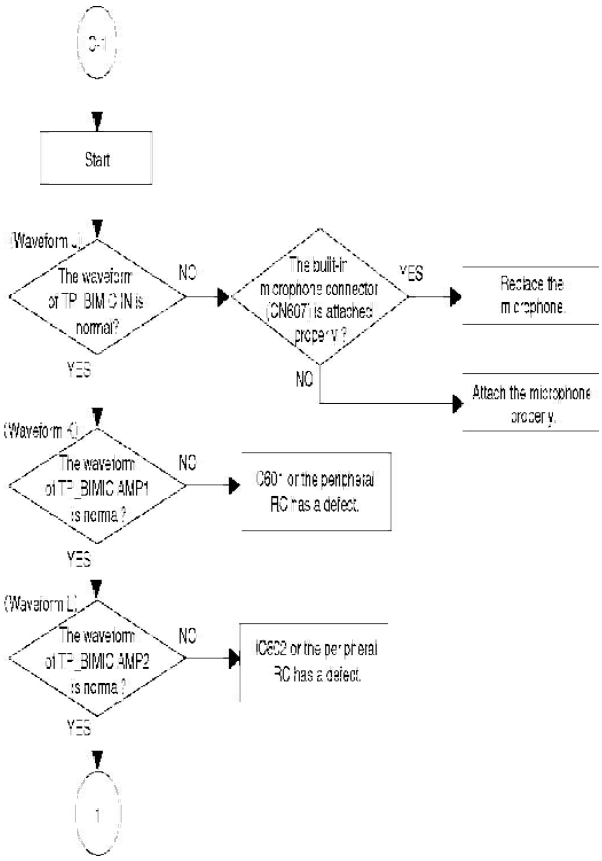
B
Start
NO
NO
YES
NO
YES
(Waveform A)
NO
NO
YES
YES
Check at the time of Power ON.
(Waveform B)
NO
NO
YES


B-1
(Waveform E)
The shutter control waveform (SUB) of CCD (IC1) is normal ?
NC
C2 and the periphery of C6, C7, D2 have defects.
YES
(Waveform F)
The IC2 input CCD waveform (C9) is normal ?
NC
(Waveform F-1)
The CCD output (IC1, 7pin) is normal ?
NC
IC1 has a defect.
YES
YES
The periphery of Q1, R9 have defects.
(Waveform G)
The output waveform of PCLK is normal ?
NC
L5, C37, IC2 and its periphery have defects.
YES
(Waveform H)
The output waveform of VSYNC, HREF is normal?
NC
L7, L8, C35, C36, IC2 and its periphery have defects.
YES
(Waveform I)
The waveform of VJV0-YUV7 is normal?
NC
RA1, RA2, IC2 and its periphery have defects

10.4. CHECK FOR SOUND BLOCK

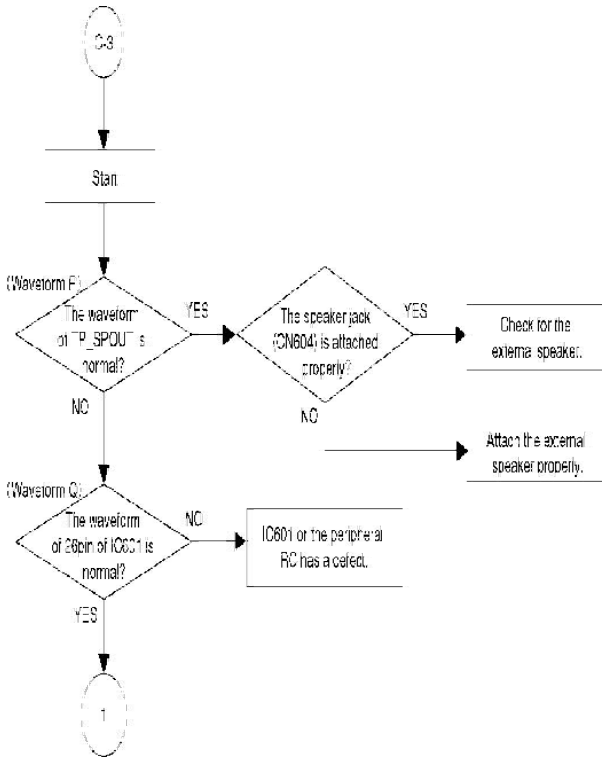


10.4.1. Built-in Microphone

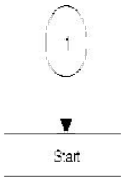


10.4.2. External Microphone

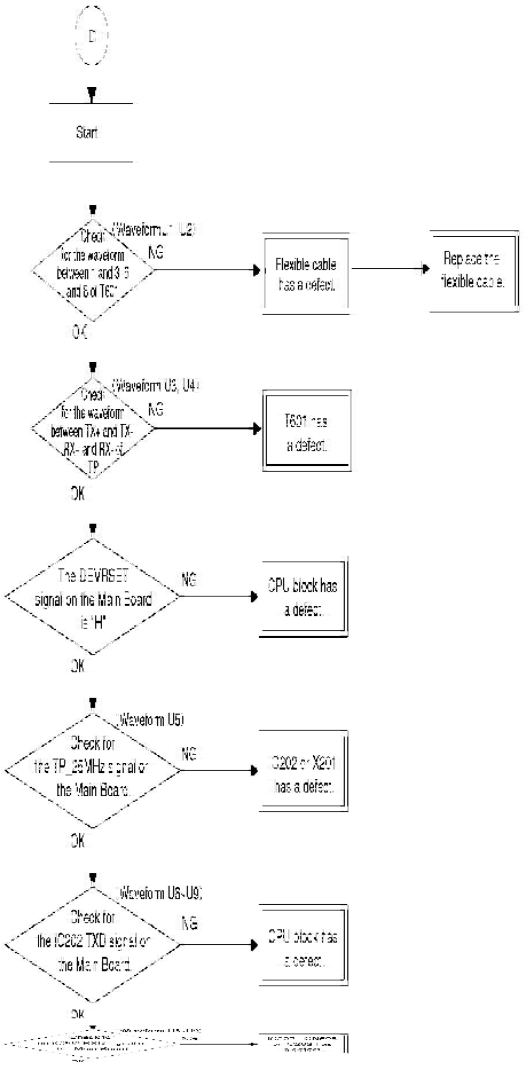
10.4.3. Speaker Output



10.4.4. Common Flow Of Built-in Microphone, External Microphone And Speaker Output

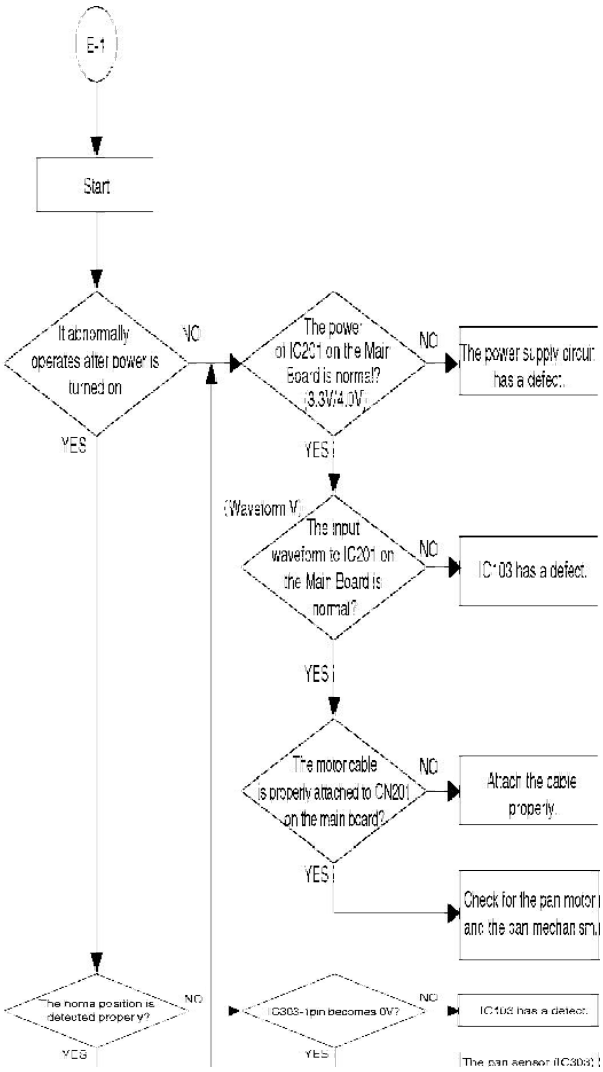


10.4.5. Check For LAN Block

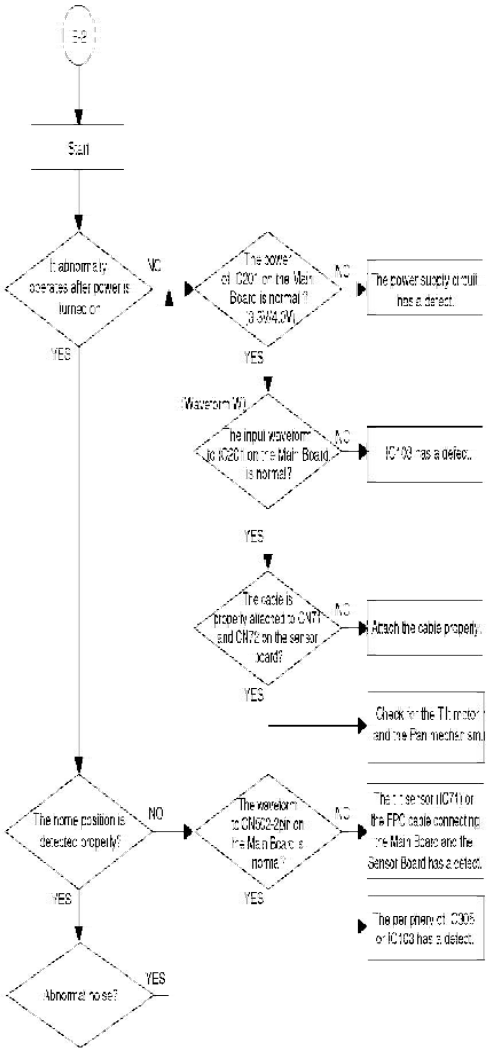


10.5. CHECK FOR MOTOR DRIVING BLOCK

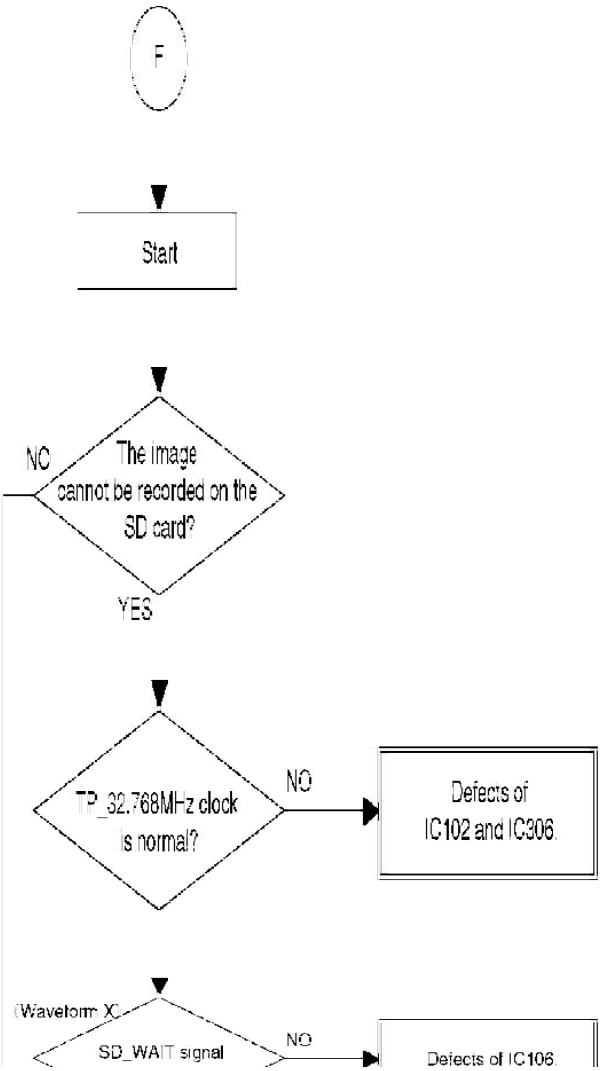
10.5.1. Check For The Action Of Pan

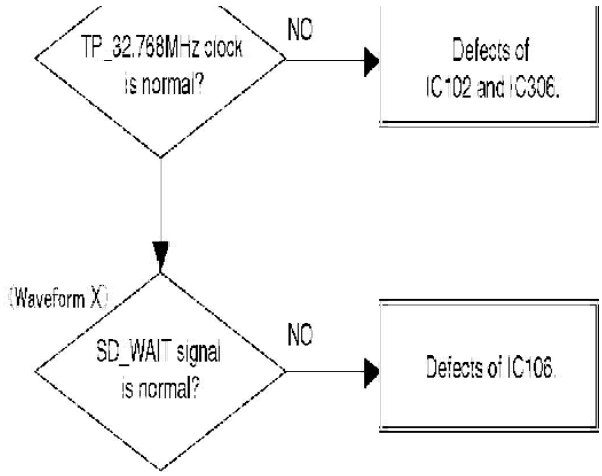


10.5.2. Check For The Action Of Tilt

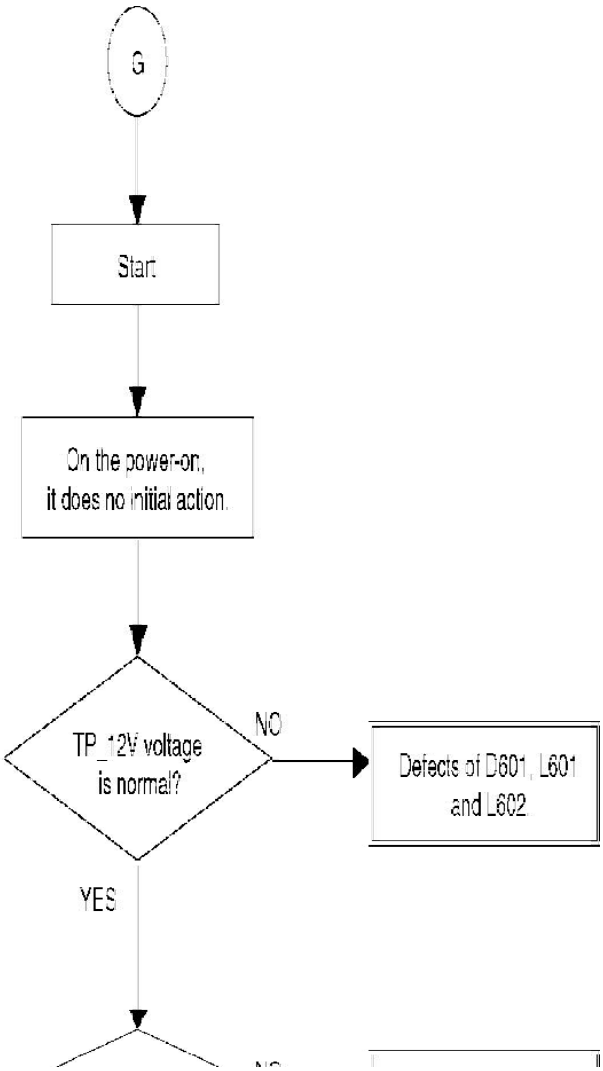


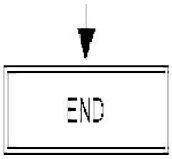
10.6. CHECK FOR SD CARD


F
Start
NG
The image cannot be recorded on the SD card?
YES
TP_32.768MHz clock is normal?
NO
Defects of IC102 and IC306.
(Waveform X)
SD_WAIT signal
NO
Defects of IC106.

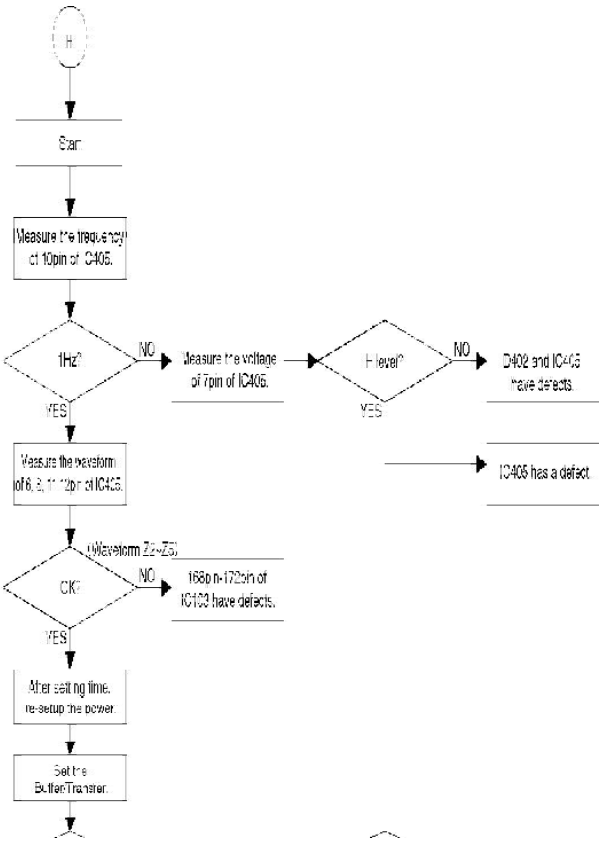


10.7. CHECK FOR POWER SUPPLY BLOCK

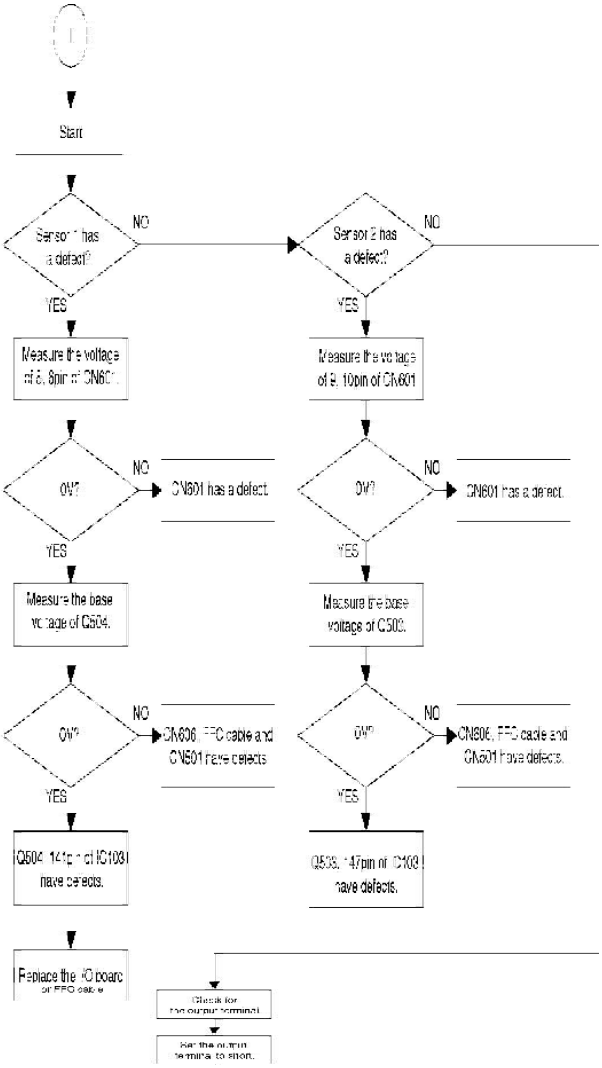

G
Start
On the power-on,
it does no initial action.
TP_12V voltage
is normal?
NO
Defects of D601, L601
and L602
YES



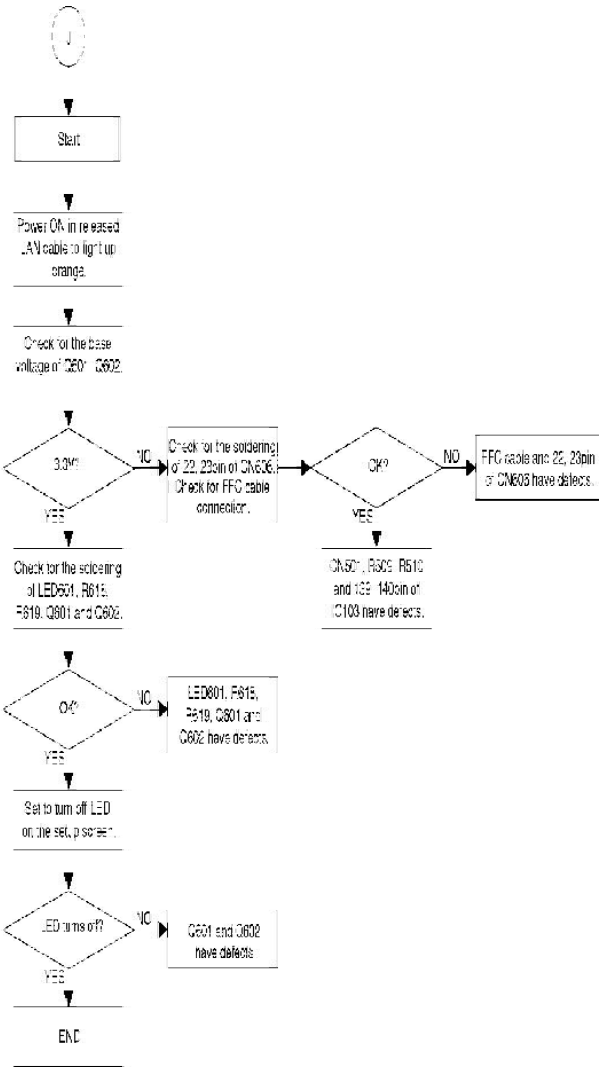
10.8. CHECK FOR RTC CIRCUIT



10.9. CHECK FOR I/O TERMINAL

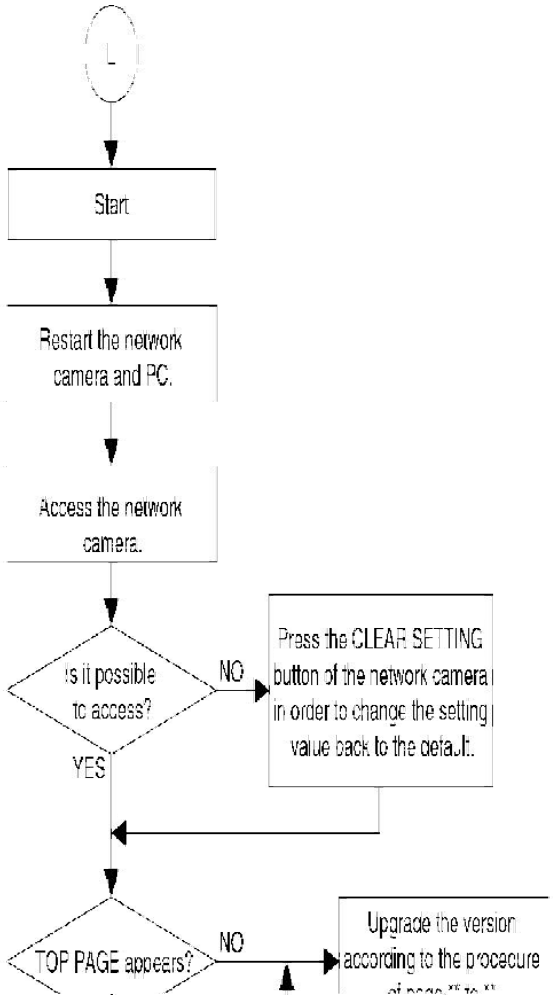


10.10. CHECK FOR LED CIRCUIT


Start
Power ON in released LAN cable to light up orange.
Check for the base voltage of Q601, Q602.
3.0V?
NO
Check for the soldering of 22, 23pin of CN606. Check for FFC cable connection.
OK?
NO
FFC cable and 22, 23pin of CN606 have defects.
YES
YES
Check for the soldering of LED601, R618, R619, Q601 and Q602.
CN501, R505, R510 and 139, 140pin of IC103 have defects.
OK?
NO
LED601, R618, R619, Q601 and Q602 have defects.
YES
Set to turn off LED on the set up screen.
LED turns off?
NO
Q601 and Q602 have defects
YES
END

10.11. CHECK FOR INITIALIZATION

10.12. CHECK FOR VERSION UPGRADE

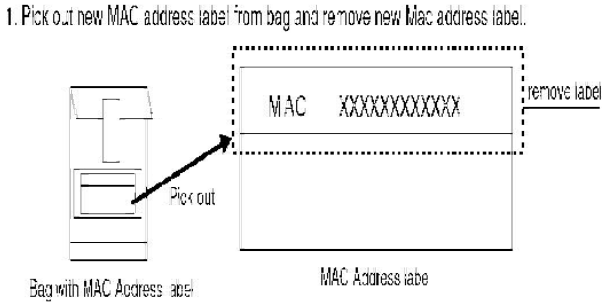

Start
Restart the network camera and PC.
Access the network camera.
Is it possible to access?
NO
Press the CLEAR SETTING button of the network camera in order to change the setting value back to the default.
YES
TOP PAGE appears?
NO
Upgrade the version according to the procedure

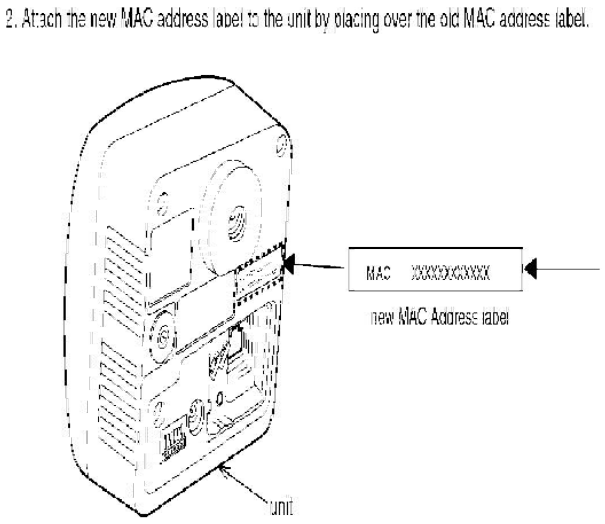
10.13. HOW TO CHANGE MAC ADDRESS LABEL

MAC address label caution

When you replace the main board, you must also attach the new MAC address label(included with the main board). Attach the new MAC address label to the unit by placing over the old MAC address label. Make sure the old address cannot be seen.

Throw away the old main board. It cannot be reused.
(If the MACaddress of the old main board is already registered via DDNS and thenused in a different camera, the camera cannot be used with DDNS service.)


1. Pick out new MAC address label from bag and remove new Mac address label.
MAC XXXXXXXXXXX
remove label
Pick out
Bag with MAC Address label
MAC Address labe


2. Attach the new MAC address label to the unit by placing over the old MAC address label.
MAC XXXXXXXXXXX
new MAC Address label
unit

11. THE WAY OF THE INITIALIZE

11.1. FACTORY DEFAULT RESET BUTTON

The camera has a Factory Default Reset button on the rear.

Pressing the Factory Default Reset button resets the camera to factory default.
If you lose your user name and password, use this button to reset the camera.

- **Press the Factory Default Reset button for 1 second when the camera is on.**
- **The indicator blinks orange, and turn off for 10 seconds.**
- **Do not turn off the camera until the indicator lights green.**

Note:

- **Internal clock will not be reset, but the time format will return to AM/PM mode. Set it again.**
- **All buffered images are deleted when resetting the camera to factory default.**

- The reset operation takes about 1 minute.

11.2. RESETTING THE CAMERA TO FACTORY DEFAULT

This feature will be executed and all camera settings reset to factory default directly after the Execute button is clicked.

1. Click [Reset to Factory Default] on the Maintenance page.
2. Click [Execute].

- The indicator blinks orange, and turn off for 10 seconds.
- All camera settings (user name, password, IP address, subnet mask etc.) are reset to factory default.
- If the camera is reset to factory default, the network connection modechanges to [Automatic Setup]. Reconfigure the camera seeing the Getting Started.

Note:

- Internal clock will not be reset, but the time format will return to AM/PM mode. Set it again.
- Please refer to Operating Instructions for default values.
- Pressing FACTORY DEFAULT RESET button resets the camera to the factory default.
- All buffered images are deleted when resetting the camera to factory default.
- The reset operation takes about 1 minute.
- Do not turn off the camera during the reset operation.

12. BLOCK DIAGRAM

13. CIRCUIT DESCRIPTION

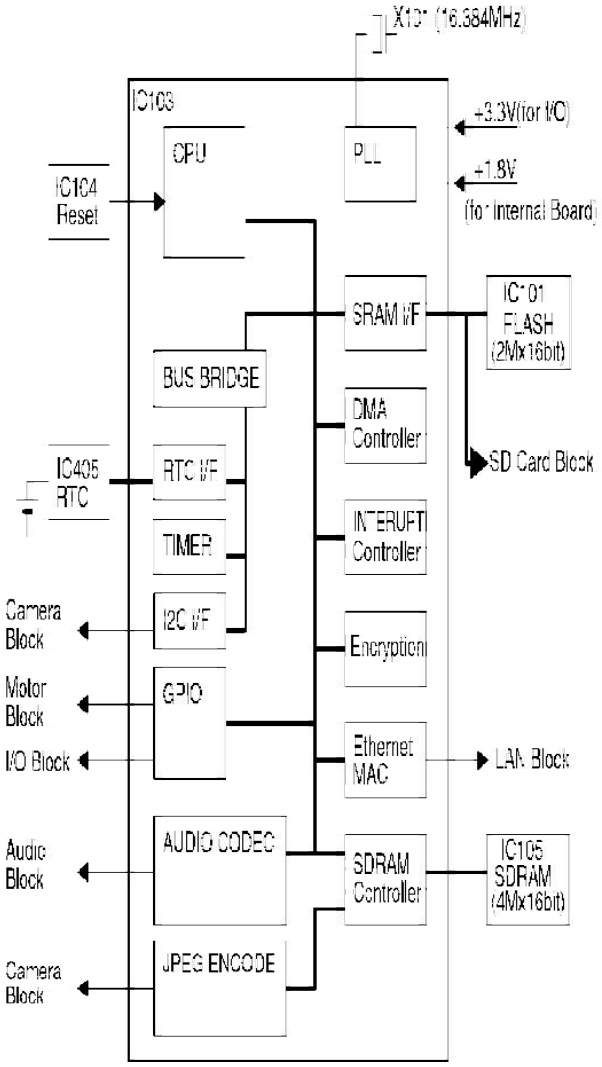
13.1. CPU PERIPHERAL BLOCK

- The IC103 is a system LSI for a network camera containing the CPU
- The power supply voltages are +3.3V (I/O) and +1.8V.
- The CPU is a 32-bit RISC CPU and performs mainly hardware control, TCP/IP protocol processing and applications such as http and FTP.
- The clock setting is 65.536MHz, which is the four times of 16.384MHz oscillation in the X101 by PLL.

- There are two types of external bus: the General-purpose bus through SRAM I/F and the bus for SDRAM only.
- The General bus is connected to a Flash Memory for program storage.
- The capacity of the Flash Memory (IC101) is 32Mbit (2Mx16bit); the program, the setting information for the network camera and the MAC address are stored.
- The SDRAM (IC105) is 64Mbit (4Mx16bit) and used for the CPU processing work, the communication data storage and the sound and image data storage.
- The RESET IC (IC104) monitors the power supply voltage, detects the rising edge of +3.3V and generates the Hardware Reset Signal.
- The IC405 is a RTC (Real Time Clock) and is used for the time setting of the image transfer. It is backed up at power-off by a lithium battery (BAT401). The I/F with the CPU has a dedicated controller. (5-line I/F)
- The Encryption block inside the IC103 is an Ipsec communication encryption engine and is used at the software protocol processing.

Signal Flow

1. When a request from the PC is received through LAN, the CGI command is analyzed at the CPU and the requested image/sound data are generated.
2. The JPEG image and sound data accumulated on the SDRAM are formed in IP packet by the protocol processing.
3. If the Ipsec is not encrypted, it is sent without change. If it is encrypted, this is carried out in the Encryption Block and a header is added to send to the Ethernet MAC part.



13.2. CAMERA BLOCK

Basic Function

<Image System>

The subject image from a lens is photoelectric-converted by CCD (IC1). The CCD output analog image signal is input to the DSP (IC2). After the A/D conversion after analog preprocessing and the specified Signal Processing, it is output as a YUV 8bit signal.

<Power Supply System>

In the power supply system, +3.3V is input from the Main Board. +2.9V is generated by a regulator and the Power Supply for CCD of +15 and -5.5V is generated by the DC-DC converter contained in the DSP.

1. CCD (IC1)

Operating Voltage: +15V, -5.5V

Effective Number of Pixels: 659 x 494

Image Size: 1/4 type

Color Filter: Original Colors RGB

Package: 14pin Plastic DIP

The CCD is driven by the horizontal driving signal (H1, H2, RG) and the vertical driving signal (V1, V2A, V2B, V3) output from the DSP (IC2). The subject image focused by a lens is converted to electrical signals, read out by the driving signal and input to the DSP through IC1(pin 7) to Q1.

2. DSP (IC2)

Characteristics: AFE, V-driver, 3-chip SEP (System Embedded Package) of the Signal Processing DSP
Power Supply: +3.3V, +2.9V
Function: CCD Drive, CDS, AGC, A/D, Luminance Signal Processing (gamma correction, outline correction etc.)
Color Signal Processing (White Balance, Matrix etc.), Automatic flaw correction AE/AWB/AGC control by the Signal Processing DSP microcomputer, Fluorescent lamp flicker-free
Package: 312pin Ceramic BGA
Clock Frequency: 24.5454MHz

<AFE Chip>
The specified sampling is performed in the CDS circuit inside the AFE chip and the noise of the CCD output signal is removed. After it is adjusted to the specified level according to the instruction from the Signal Processing DSP in the GCA circuit, it is converted to 10-bit digital signal by the A/D converter inside the AFE chip and input to the Signal Processing DSP.
Power (+3.3V) is supplied through L4 and L5 after the ON/OFF control by the Signal Processing DSP.
<V-driver Chip>
Generates the CCD power supply of +15V and -5.5V from the input of +3.3V by the external L3, D3, D4, C10 and C11.
Generates 3-values V-drive signal for CCD driving by a timing signal from the Signal Processing DSP.
<Signal Processing DSP Chip>
Processes the AFE output signal, and outputs the Analog Y signal and C signal. Outputs the CCD driving signal.
The built-in microcomputer performs the AE (Auto Exposure) and AWB (Auto White Balance) processing, and the Read/Write for each control and setting. The Read/Write for each setting to the IC is performed by the Main CPU (IC102) on the Main Board on I2CBUS (SDL, SDA).

=Image Signal Processing=
The 10bit CCD output signal from the AFE chip is processed as follows:
1. The outline in the horizontal and vertical directions is corrected
2. The characteristics of gray-scale are corrected by gamma correction.
3. The white balance is corrected.
4. The RGB signal is converted to the luminance signal (Y signal) and the color difference signal (R-Y (V), B-Y (U) signal).
5. The color saturation and phase are adjusted by color difference matrix.
6. It is output as YUV 8bit signal.

=CCD Driving Signal and Timing Signal Generation=
CCD Driving Signal [For horizontal (H1, H2, RG), vertical (V1, V2A, V2B, V3)], Timing Signal [HREF Signal, Vsync Signal, and AFE (DS1, DS2, ADCLK, CPOB)] etc. are output. The timing of these signals is set by a serial signal from the CAMERA CPU.

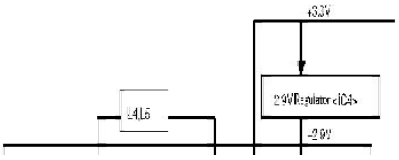
=AE Control Signal Generation=
Based on the luminance signal level detected by the image signal processing area, the AGC gain control and the exposure time control to CCD of the AFE chip (by CCD shutter speed control signal (SUBA Signal (IC2(pin V6) --> C7 --> C6 --> IC1(pin 10))) are performed.

3. Clock

Generated on 24.5454MHz crystal oscillator (X1) on the board.

4. Regulator (IC4)

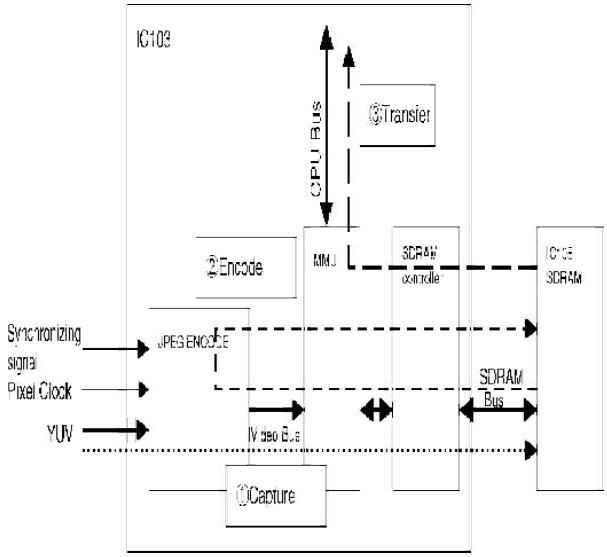
Input +3.3V, Output +2.9V
Package: 5pinSOP



13.3. JPEG BLOCK

- The IC103 is a system LSI for a network camera containing the CPU.
- The JPEC Encode Circuit, the Memory Management Unit(MMU) and the SDRAM Controller are built into this LSI.

- The image data(YUV) inputted from a Camera Block is captured to the SDRAM through the JPEG Encode Block, the MMC and the SDRAM Controller. (1)
- The captured YUV data are inputted to the JPEG Encode Block again and the JPEG processing is performed here. The compressed encode data are stored to the SDRAM. (2)
- A header is added to the encoded JPEG data by a direction of the CPU and it is transferred to a network after a protocol processing. (3)



13.4. SOUND BLOCK

External Microphone Jack (CN603)

Used with the external microphone.

Speaker Jack (CN604)

Used when connecting a speaker with a built-in amplifier, when the sound is output from a camera.

Microphone Detection (Q603)

When the external microphone plug is not inserted, pins 3 and 2 of the Microphone Jack (CN603) are short-circuited and a base current is supplied to Q603 through R603, R632 and R629 so that the Q603 goes ON and a collector (MIC_S signal) goes LOW. Alternatively, when the microphone plug is inserted, pins 3 and 2 of the CN603 become open so that the Q603 goes OFF and the MIC_S signal goes HIGH. From this signal, the CPU detects the microphone status.
The CPU turns the microphone SW on and off in the PCM Codec (IC601) for the external or the built-in microphone, as appropriate.

ALC Amplifier (IC602: For the built-in microphone, IC603: For the external microphone)

Power Supply: 3.3V
Amplifier for Auto Level Control

PCM Codec (IC601)

Power Supply Voltage: 3.3V
Clock Frequency: Contains a built-in PLL function and generates a clock from the BCLK (256 KHz). Contains an amplifier, LPF, gain adjustment, AD/DA converter, host I/F, PCM serial I/F and speaker output function.

Flow of Sound Signal

[Microphone sound]

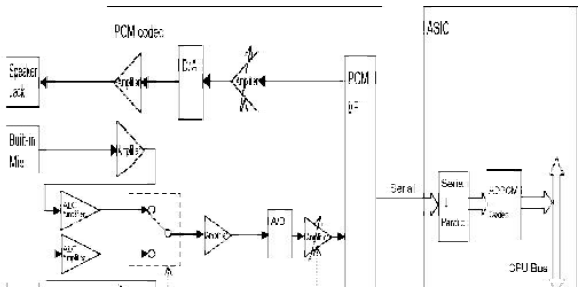
1. **The sound data input from pin 1 of the built-in microphone connector (CN607) is amplified by the amplifier in the PCM Codec (IC601) and the ALC (IC603), then input as the built-in microphone to the PCM Codec (IC601) again.**
   When the level of the input sound signal is more than the specified value, the gain is changed and the output signal level is kept constant at the ALC (IC603). Sound distortion is controlled when the input is excessive.
2. **When the external microphone is attached to the microphone jack (CN603), the sound signal input from pin 2 of the CN603 is amplified by the amplifier in the PCM Codec (IC601) and the ALC (IC602), then input as the external (microphone) to the PCM Codec (IC601) again**
   The ALC (IC602) works in the same way as the IC603.
3. **In the PCM Codec (IC601), after the sound signal is switched between the built-in microphone and the external microphone by a register setting from the host, amplification, AD conversion and gain adjustment are performed.**
   The sampling frequency of the A/D conversion is 8kHz and it is converted to the PCM in the format of 8bit and law. Then, 64kbps data are output to the ASIC (101) through the Serial I/F.

The data transfer of the Serial I/F is BCLK (256 kHz).

4. **The data compression of 32kbps is performed in the ADPCM Block of the ASIC (101) and the data transferred as sound data.**

[Speaker Sound]

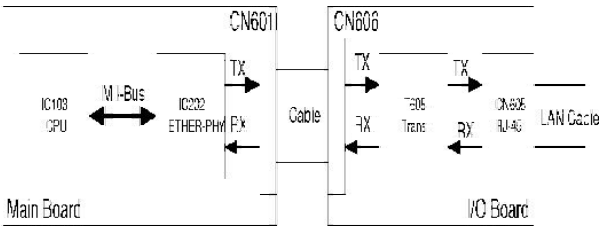
1. **The ADPCM sound data are sent from the PC and, after data decompression in the ADPCM block of the ASIC (101), the data are transferred as the sound data of 64kbps to the PCM Codec (IC601) through the Serial I/F.**
2. **After the μ law to linear conversion, amplification and DA conversion, they are output to pin 2 of the speaker jack (CN604) as sound output signal in the PCM Codec (IC601).**



13.5. LAN BLOCK

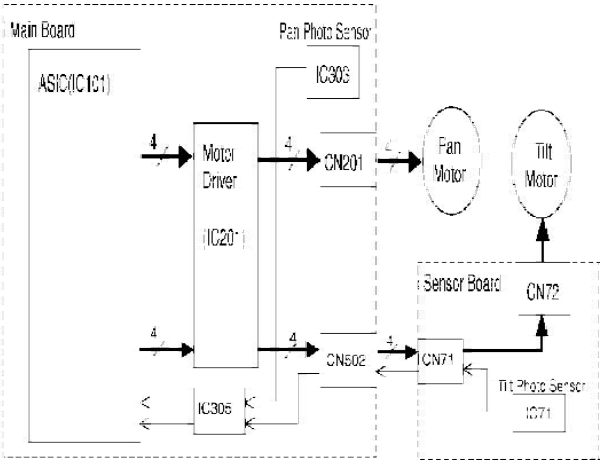
Composed of the IC103 (CPU), the IC202 (ETHER-PHY), the T601 (Transformer) and the CN605 (RJ45).
The T605 (Transformer) obtains isolation between the Set and the Ethernet.
The IC103 (CPU) and the IC202 (ETHER-PHY) are connected by a signal called MIIBus and it makes Ether net data sending and receiving possible.

Sending
The electrical signal sent from the IC103 is converted to Ethernet data at the IC202 and sent from the CN605 through the T601.
Receiving
The Ethernet data received from the CN605 is converted to electrical data at the IC202 and received to the IC103.



13.6. MOTOR DRIVING BLOCK

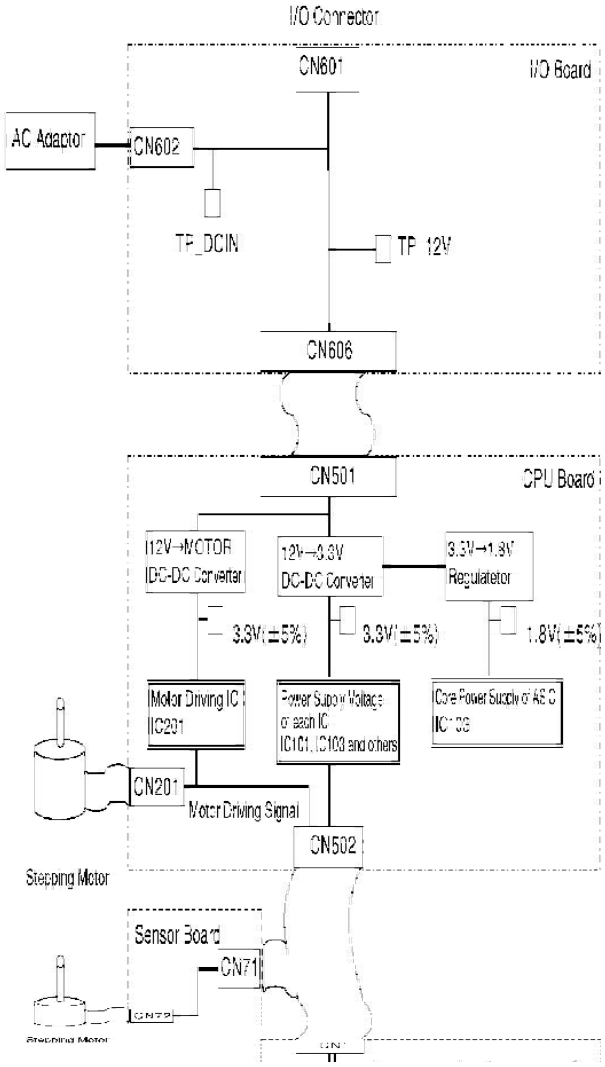
The pan tilt is performed, as the ASIC (IC101) mounted on the Main Board controls the Motor Driver (IC201). The home position of the pan tilt operation is detected by the Pan Photo Sensor (IC303 on the Main Board) and the Tilt Photo Sensor (IC71 on the Sensor Board).



13.7. SD CARD BLOCK

The data written on the SD Card are read out by the SD Card Controller and divided into IP Packets in the ASIC to be sent.
The JPEG-compressed image data from the ASIC are written on the SD Card by the SD Card Controller.

13.8. POWER SUPPLY BLOCK



13.9. OTHERS

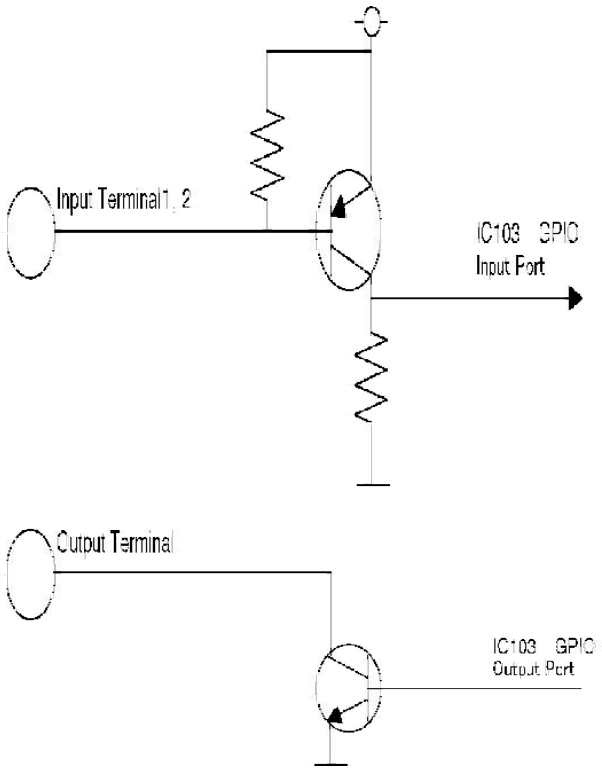
13.9.1. I/O Terminal

- The Input terminal has two systems; both of them are connected to the Input Port of the IC103 GPIO.

- Due to Internal Pull-up Resistance, the PNP Transistor (Q504, Q503) on the following level is usually in the OFF state and the Input Port connected to the collector is at L level.

- If the terminal is short-circuited with the GND or the signal of L level is input, the PNP Transistor goes ON and the Input Port goes to H level.

- The CPU checks the state of this port regularly to detect a change in this signal.
- The Output terminal is controlled by the Output Port of the IC103. When the Port output is L, the transistor (Q501) on the following level is OFF and, when the output is H, the transistor is ON. This transistor has open collector output and it controls external equipment via external pull-up.



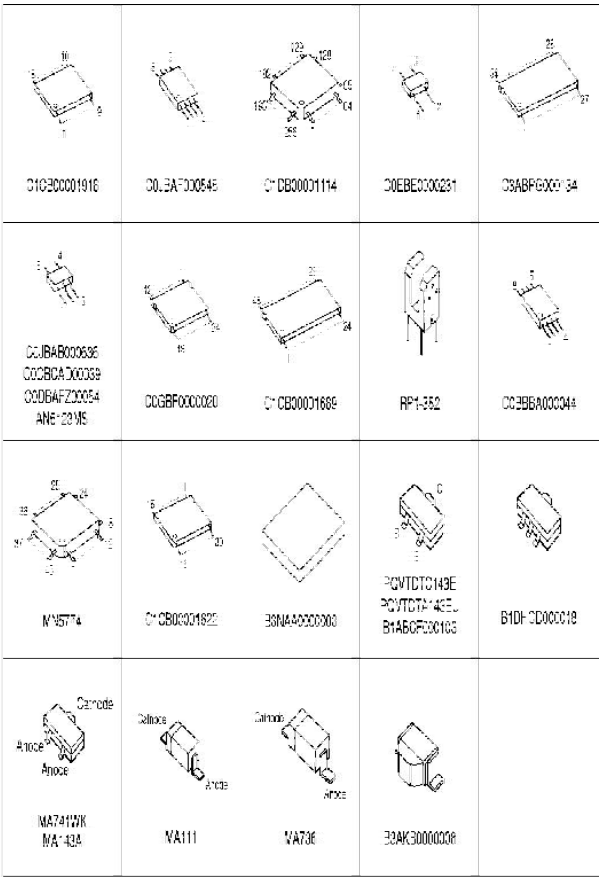
13.9.2. Clear Setting SW

- The Clear Setting SW (SW101) is connected to the Input Port of the GPIO. It is usually at H level and goes to L level, when the SW is pressed.
- The CPU monitors this Input Port regularly and, if it detects that this SW is pressed longer than a specified period, the setting values other than the RTC are returned to factory settings.

13.9.3. LED

- The LED (LED601) has two-color LEDs (red and green). When the transistor (Q601, Q602) connected to each LED is turned ON/OFF via the Output Port of the IC103, it controls the ON/OFF of the LED.

14. TERMINAL GUIDE OF ICS, TRANSISTORS AND DIODES



15. HOW TO REPLACE A FLAT PACKAGE IC

15.1. PREPARATION

- PbF (: Pb free) Solder

- Soldering Iron

Tip Temperature of 700°F ± 20°F (370°C ± 10°C)

Note: We recommend a 30 to 40 Watt soldering iron. An expert may be able to use a 60 to 80 Watt iron where someone with less experience could overheat and damage the PCB foil.

- Flux

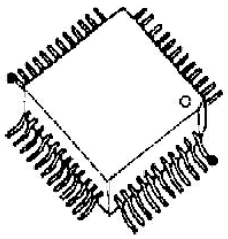
Recommended Flux: Specific Gravity 0.82.

Type RMA (lower residue, non-cleaning type)

Note: See ABOUT LEAD FREE SOLDER (PbF: Pb free) ().

15.2. PROCEDURE

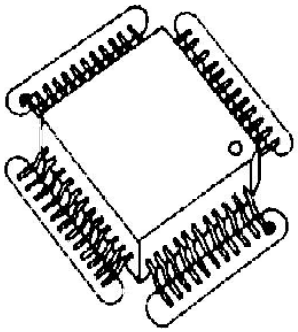
1. Tack the flat pack IC to the PCB by temporarily soldering two diagonally opposite pins in the correct positions on the PCB.



Temporary soldering point.

Be certain each pin is located over the correct pad on the PCB.

2. Apply flux to all of the pins on the IC.



Flux

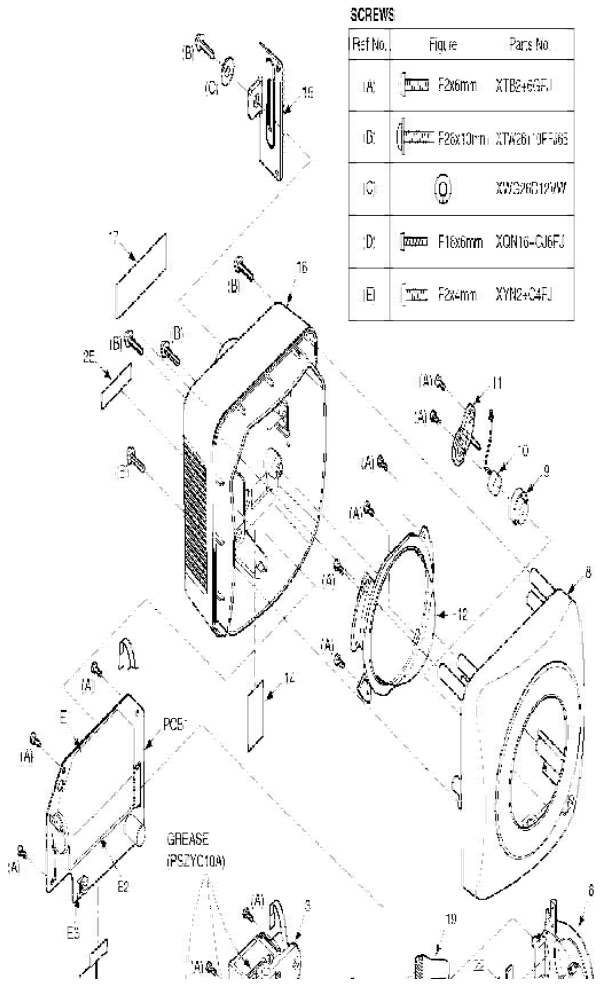
3. Being careful to not unsolder the tack points, slide the soldering iron along the tips of the pins while feeding enough solder to the tip so that it flows under the pins as they are heated.

15.3. REMOVING SOLDER FROM BETWEEN PINS

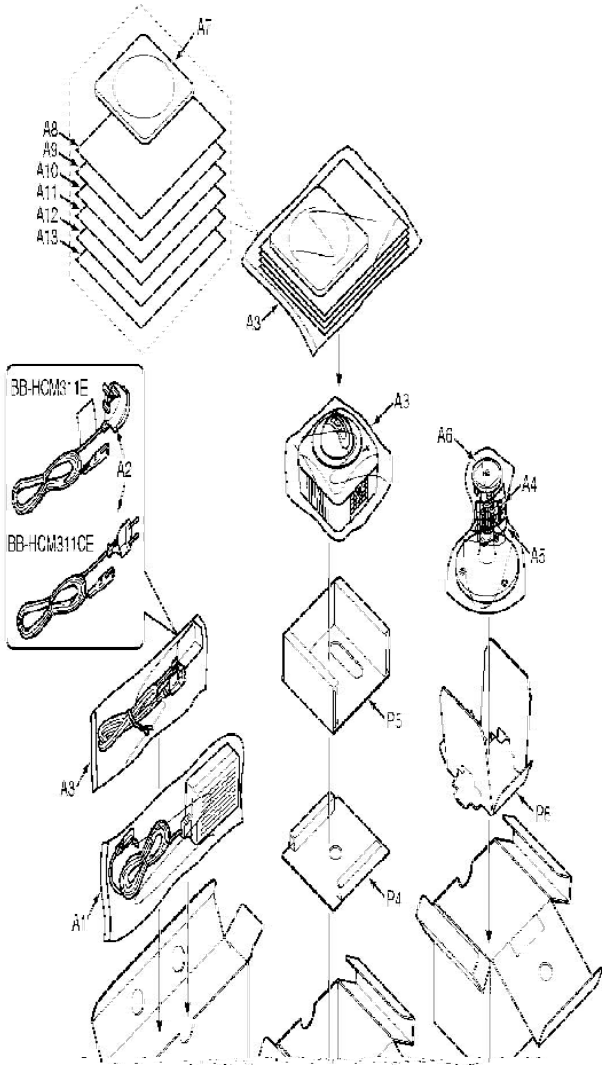
1. Add a small amount of solder to the bridged pins.

2. With a hot iron, use a sweeping motion along the flat part of the pin to draw the solder from between the adjacent pads.

16. CABINET AND ELECTRICAL PARTS LOCATION



17. ACCESSORIES AND PACKING MATERIALS


A7
A8
A9
A10
A11
A12
A13
A3
BB-HCM311E
A2
BB-HCM311CE
A3
A6
A4
A5
P5
P6
P4
A1

18. REPLACEMENT PARTS LIST

Note:

1. **RTL (Retention Time Limited)**
   The marking (RTL) indicates that the Retention Time is limited for this item.
   After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability depends on the type of assembly and the laws governing parts and product retention. At the end of this period, the assembly will no longer be available.
2. **Important safety notice**
   Components identified by the ⚠ mark indicates special characteristics important for safety. When replacing any of these components, only use specified manufacture's parts.
3. **The S mark means the part is one of some identical parts. For that reason, it may be different from the installed part.**
4. **ISO code (Example: ABS-94HB) of the remarks column shows quality of the material and a flame resisting grade about plastics.**
5. **RESISTORS & CAPACITORS**
   Unless otherwise specified;
   All resistors are in ohms (Ω), k=1000 , M=1000k
   All capacitors are in MICRO FARADS (F), p= (F)
   ***Type & Wattage of Resistor**

18.1. CABINET AND ELECTRICAL PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
1	PSJE1043Z	LEAD WIRE,FFC CABLE	
2	PSWQHCM311A	TILT MOTOR UNIT	
3	PSWQHCM311N	PAN MOTOR UNIT	
4	PSKV1040Z1	EYE CENTER COVER	ABS-V0
5	PSLP1315Z	LENS UNIT	ABS-V0
6	PSKE1073X1	EYE RIGHT COVER	ABS-V0
7	PSKE1072X1	EYE LEFT COVER	ABS-V0
8	PSKM1116Z1	CABINET BODY	ABS+PC-V0
9	PSMG1007Z	RUBBER PARTS,MIC	
10	PSJM1007Z	MICROPHONE	
11	PSHR1322Y	OPTIC CONDUCTIVE PARTS, LED LENS	
12	PSKV1041Z	COVER,DOME	PC-HB
13	PSHR1318Z	PAN GEAR	POM-HB
14	PSHX1234Z	PLASTIC PARTS,SHEET	
15	PSHG1250Z	RUBBER PARTS,SD	
16	PSKF1082Y1	CABINET COVER	ABS+PC-V0
17	PSGT2664X	NAME PLATE(FOR BB-HCM311CE)	
17	PSGT2665Y	NAME PLATE(FOR BB-HCM311E)	
18	PSKV1039Z1	LENS COVER	ABS-V0
19	PSUP1508Z	LEAD WIRE,FPC CABLE	
20	PSMH1277Z	CHASSIS	
21	PSMH1278Z	CHASSIS	
22	J0KD00000090	SPACER,FILTER	
23	PSHS1048Z	FELT PART,FPC TAPE	
24	PSHS1051Z	FELT PART,CORE TAPE	
25	PSQA2830Z	LABEL,CAUTION	

18.2. ACCESSORIES AND PACKING MATERIALS

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PSWEC10CE	AC ADAPTOR(FOR BB-HCM311CE)	
A1	PSWEC10E	AC ADAPTOR(FOR BB-HCM311E)	
A2	PFJA02A006Z	POWER CORD(FOR BB-HCM311CE)	
A2	PSJA1106Z	POWER CORD(FOR BB-HCM311E)	
A3	XZB20X30A05	PROTECTION COVER(FOR SETADN MANUALS etc.)	
A4	PQHE5004Y	SCREW	
A5	XZB05X08A03	PROTECTION COVER(FOR SCRES)	
A6	PSKL1020W	STAND	
A7	PSQX3755ZCD	INSTRUCTION BOOK,CD-ROM	
A8	PSQW2227Z	LEAFLET,GS 7LANGUAGES(FOR BB-HCM311CE)	
A8	PSQW2274Y	LEAFLET,POWER CORD(FOR BB-HCM311E)	
A9	PSQW2285Z	LEAFLET,RECORD SOFT	
A10	PSQW2290Z	LEAFLET,I/O CAUTION(FOR BB-HCM311CE)	
A10	PSQW2299Z	LEAFLET,I/O CAUTION(FOR BB-HCM311E)	
A11	PSQW2342Z	LEAFLET,SAFE(FOR BB-HCM311CE ONLY)	
A12	PSQX3752Z	INSTRUCTION BOOK(INSTALLATION)	
A13	PSQX3753Z	INSTRUCTION BOOK(G/S)	
P1	PSPK2325Z	GIFT BOX	
P2	PSPN1177Z	ACCESSORY BOX	
P3	PSPN1176Z	ACCESSORY BOX	
P4	PSPD1302Z	CUSHION	
P5	PSPD1299Z	CUSHION	
P6	PSPD1322Z	CUSHION	

18.3. MAIN BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PSWP1CM311CE	MAIN BOARD ASS'Y (RTL)	
		(ICS)	
IC101	PSWP1CM311CE	There is no parts supply of only IC101 Please order PCB1.	
IC102	C0JBAF000548	IC	
IC103	C1DB00001114	IC	
IC104	C0EBE0000231	IC	
IC105	C3ABPG000134	IC	
IC106	C0JBAB000636	IC	
IC201	C0GBF0000020	IC	
IC202	C1CB00001689	IC	
IC303	RPI-352	IC	S
IC305	C0BBBA000044	IC	
IC306	MN5774	IC	
IC403	C0DBAFZ00054	IC	
IC404	C0DBAFZ00054	IC	
IC405	C1CB00001918	IC	
IC407	C0CBCAD00039	IC	
		(TRANSISTORS)	
Q301	PQVTDTC143E	TRANSISTOR(SI)	S
Q401	B1DHCD000018	TRANSISTOR(SI)	
Q402	B1DHCD000018	TRANSISTOR(SI)	
Q501	B1GBGFCJ0002	TRANSISTOR(SI)	
Q503	PQVTDTA143EU	TRANSISTOR(SI)	S
Q504	PQVTDTA143EU	TRANSISTOR(SI)	S
		(DIODES)	
D401	MA111	DIODE(SI)	S
D402	MA741WK	DIODE(SI)	S
D403	MA736	DIODE(SI)	S
D404	MA736	DIODE(SI)	S
DA301	MA143A	DIODE(SI)	S
		(BATTERY)	
BAT401	CR2032/1VC1	LITHIUM BATTERY	
		(CAPACITORS)	
C102	ECJ1VF1C104Z	0.1	
C103	F1J0J1060006	10	
C104	ECJ1VC1H101J	100p	
C105	ECJ1VF1C104Z	0.1	
C109	ERJ3GEY0R00	0	
C110	ECJ1VC1H180J	18p	
C111	ECJ1VC1H200J	20p	
C112	ECJ1VF1A105Z	1	
C113	ECJ1VF1C104Z	0.1	
C114	F1J0J1060006	10	
C115	ECJ1VB1C104K	0.1	
C117	ECJ1VF1C104Z	0.1	
C118	ECJ1VF1C224Z	0.22	
C120	ECJ1VF1C104Z	0.1	
C121	ECJ1VB1E103K	0.01	

Ref. No.	Part No.	Part Name & Description	Remarks
C122	ECJ1VB1E103K	0.01	
C123	ECJ1VF1C104Z	0.1	
C124	ECJ1VF1C104Z	0.1	
C125	ECJ1VB1E103K	0.01	
C126	ECJ1VB1E103K	0.01	
C128	ECJ1VF1C104Z	0.1	
C129	ECJ1VF1C104Z	0.1	
C130	F1J0J1060006	10	
C131	ECJ1VC1H101J	100p	
C132	ECJ1VF1C104Z	0.1	
C133	ECJ1VF1C104Z	0.1	
C134	ECJ1VF1C104Z	0.1	
C135	ECJ1VF1C104Z	0.1	
C136	ECJ1VF1C104Z	0.1	
C137	ECJ1VB1E103K	0.01	
C138	ECJ1VB1E103K	0.01	
C139	ECJ1VF1C104Z	0.1	
C140	ECJ1VF1C104Z	0.1	
C141	ECJ1VB1E103K	0.01	
C142	ECJ1VB1E103K	0.01	
C143	ECJ1VF1C104Z	0.1	
C144	ECJ1VF1C104Z	0.1	
C145	ECJ1VB1E103K	0.01	
C146	ECJ1VB1E103K	0.01	
C147	ECJ1VF1C104Z	0.1	
C148	ECJ1VF1C104Z	0.1	
C149	ECJ1VF1C104Z	0.1	
C150	ECJ1VF1C104Z	0.1	
C151	ECJ1VB1E103K	0.01	
C152	ECJ1VB1E103K	0.01	
C153	ECJ1VF1C104Z	0.1	
C154	ECJ1VF1C104Z	0.1	
C155	ECJ1VB1E103K	0.01	
C156	ECJ1VB1E103K	0.01	
C157	ECJ1VF1C104Z	0.1	
C158	ECJ1VF1C104Z	0.1	
C159	F1J0J1060006	10	
C160	F1J0J1060006	10	
C161	ECJ1VC1H220J	22p	
C164	ECJ1VF1C104Z	0.1	
C165	ECJ1VB1E103K	0.01	
C166	ECJ1VF1C104Z	0.1	
C167	ECJ1VB1E103K	0.01	
C168	ECJ1VF1C104Z	0.1	
C169	ECJ1VB1E103K	0.01	
C170	ECJ1VF1C104Z	0.1	
C171	ECJ1VF1C104Z	0.1	
C172	ECJ1VF1C104Z	0.1	
C190	ECJ1VF1C104Z	0.1	
C192	ECJ1VB1E103K	0.01	
C193	ECJ1VF1C104Z	0.1	
C201	ECJ1VF1C104Z	0.1	
C202	ECJ1VF1C104Z	0.1	
C203	ECJ1VC1H120J	12p	
C204	ECJ1VC1H120J	12p	
C206	ECJ1VF1C104Z	0.1	
C207	ECJ1VB1E103K	0.01	

[redacted]	[redacted]	[redacted]	

Ref. No.	Part No.	Part Name & Description	Remarks
C208	F1J0J1060006	10	
C213	ECJ1VC1H040C	4p	
C214	ECJ1VF1C104Z	0.1	
C215	ECJ1VF1C104Z	0.1	
C224	ECJ1VF1C104Z	0.1	
C225	ECJ1VF1C104Z	0.1	
C226	ECJ1VF1C104Z	0.1	
C227	ECJ1VF1C104Z	0.1	
C307	ECJ1VF1C104Z	0.1	
C320	ECJ1VF1C104Z	0.1	
C322	ECJ1VF1C104Z	0.1	
C323	F1J0J1060006	10	
C324	ECUV1H101JCV	100p	S
C325	ECJ1VF1C104Z	0.1	
C327	ECUV0J105KBV	1	S
C330	ECJ1VC1H150J	15p	
C401	F2B1E1020001	1000	
C402	PFCX1EY106ZF	10	S
C403	PFCX1EY106ZF	10	S
C404	ECJ1VF1E104Z	0.1	
C405	ECJ1VF1E104Z	0.1	
C406	PFCX1EY106ZF	10	S
C407	PFCX1EY106ZF	10	S
C408	ECJ1VF1C104Z	0.1	
C411	ECJ1VB1E103K	0.01	
C412	ECJ1VB1E103K	0.01	
C413	F4Z0J4760001	47	
C414	F4Z0J4760001	47	
C415	ECJ1VF1C104Z	0.1	
C416	ECJ1VF1C104Z	0.1	
C417	F1J0J1060006	10	
C418	F1J0J1060006	10	
C420	ECJ1VF1A105Z	1	
C422	ECJ1VF1C104Z	0.1	
C424	ECJ1VF1C104Z	0.1	
C426	F1J0J1060006	10	
C444	ECJ1VF1A105Z	1	
C501	ECJ1VF1C104Z	0.1	
C502	F1J0J1060006	10	
C503	ECJ1VF1C104Z	0.1	
C504	ECJ1VF1C104Z	0.1	
C506	ECJ1VC1H221J	220p	
C510	ECJ1VC1H221J	220p	
C516	ECJ1VC1H221J	220p	
C522	ECJ1VC1H221J	220p	
C540	ECJ1VB1H102K	0.001	
C543	ECJ1VF1C104Z	0.1	
C544	ECJ1VF1C104Z	0.1	
C545	ECJ1VF1C104Z	0.1	
C546	ECJ1VF1C104Z	0.1	
		(CONNECTORS)	
CN201	K1MN04B00042	CONNECTOR,4P	
CN301	K1NA09E00022	CONNECTOR,9P	
CN501	K1MN33B00016	CONNECTOR,33P	
CN502	K1MN27B00030	CONNECTOR,27P	

Ref. No.	Part No.	Part Name & Description	Remarks
		(COILS AND CERAMIC FILTER)	
L101	G1C100K00031	COIL	
L201	J0JBC0000071	CERAMIC FILTER	
L202	G1CR12J00003	COIL	
L203	J0JBC0000071	CERAMIC FILTER	
L401	G1C220ZA0011	COIL	
L402	G1C220ZA0011	COIL	
L403	G1C100M00027	COIL	
L404	G1C100M00027	COIL	
L407	G1C100K00031	COIL	
L501	G1C100K00031	COIL	
L502	PQLQR1RS241	COIL	S
R101	PQLQR1RM471	COIL	S
		(RESISITORS)	
R103	ERJ3GEY0R00	0	
R107	ERJ3GEYJ103	10k	
R109	ERJ3GEYJ103	10k	
R110	ERJ3GEYJ103	10k	
R111	ERJ3GEYJ103	10k	
R115	ERJ3GEYJ103	10k	
R116	ERJ3GEYJ103	10k	
R117	ERJ3GEYJ103	10k	
R119	ERJ3GEYJ103	10k	
R120	ERJ3GEYJ101	100	
R121	ERJ3GEYJ105	1M	
R122	ERJ3GEYJ103	10k	
R123	ERJ3GEYJ103	10k	
R124	ERJ3GEYJ101	100	
R125	ERJ3GEY0R00	0	
R126	ERJ3GEYJ271	270	
R130	ERJ3GEYJ330	33	
R132	ERJ3GEYJ103	10k	
R133	ERJ3GEYJ473	47k	
R134	ERJ3GEYJ473	47k	
R135	ERJ3GEYJ473	47k	
R138	ERJ3GEY0R00	0	
R139	ERJ3GEYJ103	10k	
R140	ERJ3GEYJ473	47k	
R201	ERJ3GEYJ103	10k	
R202	ERJ3GEYJ102	1k	
R203	ERJ3GEYJ103	10k	
R204	ERJ3EKF1102	0	
R205	ERJ3EKF2001	0	
R206	ERJ3GEY0R00	0	
R207	ERJ3GEY0R00	0	
R208	ERJ3GEY0R00	0	
R209	ERJ3GEY0R00	0	
R210	ERJ3EKF1541	0	
R211	ERJ3GEYJ103	10k	
R212	ERJ3GEYJ103	10k	
R213	ERJ3GEYJ103	10k	
R214	ERJ3GEYJ103	10k	
R215	ERJ3EKF51R1	0	
R216	ERJ3EKF51R1	0	
R217	ERJ3EKF61R9	0	
R218	ERJ3EKF61R9	0	

[illegible]	[illegible]	[illegible]	

Ref. No.	Part No.	Part Name & Description	Remarks
R219	ERJ3GEYJ470	47	
R220	ERJ3GEYJ470	47	
R221	ERJ3GEYJ470	47	
R223	ERJ3GEYJ470	47	
R225	ERJ3GEYJ470	47	
R226	ERJ3GEYJ470	47	
R227	ERJ3GEY0R00	0	
R228	ERJ3GEY0R00	0	
R229	ERJ3GEY0R00	0	
R230	ERJ3GEY0R00	0	
R310	ERJ3GEYJ103	10k	
R311	ERJ3GEYJ103	10k	
R312	ERJ3GEY0R00	0	
R313	ERJ3GEY0R00	0	
R314	ERJ3GEY0R00	0	
R315	ERJ3GEY0R00	0	
R316	ERJ3GEYJ103	10k	
R317	ERJ3GEY0R00	0	
R318	ERJ3GEYJ103	10k	
R319	ERJ3GEYJ103	10k	
R320	ERJ3GEYJ104	100k	
R321	ERJ3GEYJ104	100k	
R322	ERJ3GEYJ472	4.7k	
R323	ERJ3GEYJ103	10k	
R325	ERJ3GEYJ472	4.7k	
R326	ERJ3GEYJ104	100k	
R328	ERJ3GEYJ104	100k	
R329	ERJ3GEYJ103	10k	
R330	ERJ3GEYJ103	10k	
R331	ERJ3GEYJ101	100	
R333	ERJ3GEYJ470	47	
R334	ERJ3GEYJ470	47	
R335	ERJ3GEYJ470	47	
R336	ERJ3GEYJ470	47	
R337	ERJ3GEYJ470	47	
R338	ERJ3GEYJ470	47	
R339	ERJ3GEYJ470	47	
R340	ERJ3GEYJ470	47	
R341	ERJ3GEYJ103	10k	
R342	ERJ3GEYJ103	10k	
R344	ERJ3GEY0R00	0	
R345	ERJ3GEYJ103	10k	
R401	ERJ3GEYJ152	1.5k	
R402	ERJ3GEYJ100	10	
R403	ERJ3GEYJ100	10	
R404	ERJ3GEYJ470	47	
R405	ERJ3GEYJ470	47	
R406	ERJ3GEY0R00	0	
R407	ERJ3GEY0R00	0	
R408	ERJ3GEYJ332	3.3k	
R409	ERJ3EKF2702	27k	
R410	ERJ3EKF1202	12k	
R411	ERJ3EKF4702	47k	
R412	ERJ3EKF2002	20k	
R413	ERJ3GEYJ272	2.7k	
R414	ERJ3GEYJ272	2.7k	
R416	PQ4R10XJ271	270	S

[illegible]	[illegible]	[illegible]	[illegible]

Ref. No.	Part No.	Part Name & Description	Remarks
R501	ERJ3GEYJ470	47	
R502	ERJ3GEYJ470	47	
R503	ERJ3GEYJ470	47	
R504	ERJ3GEYJ470	47	
R505	ERJ3GEYJ470	47	
R506	ERJ3GEYJ470	47	
R507	ERJ3GEYJ470	47	
R508	ERJ3GEYJ470	47	
R509	ERJ3GEYJ470	47	
R510	ERJ3GEYJ470	47	
R511	ERJ3GEY0R00	0	
R512	ERJ3GEY0R00	0	
R513	ERJ3GEY0R00	0	
R514	ERJ3GEY0R00	0	
R515	ERJ3GEY0R00	0	
R516	ERJ3GEYJ470	47	
R518	ERJ3GEYJ101	100	
R520	ERJ3GEYJ561	560	
R521	ERJ3GEYJ561	560	
R522	ERJ3GEYJ470	47	
R523	ERJ3GEYJ470	47	
R525	ERJ3GEYJ470	47	
R526	ERJ3GEYJ470	47	
R529	ERJ3GEYJ103	10k	
R530	ERJ3GEYJ103	10k	
R531	ERJ3GEYJ470	47	
R532	ERJ3GEY0R00	0	
R533	ERJ3GEYJ470	47	
R534	ERJ3GEY0R00	0	
R535	ERJ3GEY0R00	0	
R536	ERJ3GEYJ470	47	
R537	ERJ3GEY0R00	0	
R538	ERJ3GEYJ470	47	
R539	ERJ3GEYJ332	3.3k	
R540	ERJ3GEYJ332	3.3K	
		(COMPONENTS PARTS)	
RA201	D1H84704A037	RESISTOR ARRAY	
RA202	D1H84704A037	RESISTOR ARRAY	
RA301	D1H83304A036	RESISTOR ARRAY	
RA302	D1H83304A036	RESISTOR ARRAY	
RA303	D1H83304A036	RESISTOR ARRAY	
RA304	D1H83304A036	RESISTOR ARRAY	
RA305	D1H83304A036	RESISTOR ARRAY	
RA306	D1H83304A036	RESISTOR ARRAY	
RA307	D1H81034A037	RESISTOR ARRAY	
RA502	PSLQR2C601MT	RESISTOR ARRAY	
RA503	PSLQR2C601MT	RESISTOR ARRAY	
		(SWITCH)	
SW101	EVQPSM02K	SWITCH	
		(CRYSTAL OSCILLATORS)	
X101	H0J163500014	CRYSTAL OSCILLATOR	
X201	H0J250500038	CRYSTAL OSCILLATOR	
		(OHTERS)	

Ref. No.	Part No.	Part Name & Description	Remarks
E1	PSHX1233Z	PLASTIC PARTS,SHEET	
E2	PSHX1205Z	PLASTIC PARTS,SHEET	
E3	PSHR1325Z	SPACER	

18.4. I/O BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PSWP2CM331CE	I/O BOARD ASS'Y (RTL)	
		(ICS)	
IC601	C1CB00001622	IC	
IC602	AN6123MS	IC	
IC603	AN6123MS	IC	
		(TRANSISTORS)	
Q601	PQVTDTC143E	TRANSISTOR(SI)	S
Q602	PQVTDTC143E	TRANSISTOR(SI)	S
Q603	B1ABCF000103	TRANSISTOR(SI)	
		(DIODES)	
D601	MA736	DIODE(SI)	S
DA601	MA143A	DIODE(SI)	S
DA602	MA143A	DIODE(SI)	S
DA603	MA143A	DIODE(SI)	S
LED601	B3AKB0000008	DIODE(SI)	
		(CAPACITORS)	
C601	ECUV1H100DCV	10p	S
C602	ECJ1VF1C104Z	0.1	
C603	ECUV1H121JCV	120p	
C604	ECUV1H121JCV	120p	
C605	ECJ1VF1C104Z	0.1	
C606	ECST0JX476	47	S
C607	PQCUV1A105KB	1	S
C608	ECJ1VF1C104Z	0.1	
C609	ECST0JX476	47	S
C610	ECJ1VF1E104Z	0.1	
C611	F1K3A222A002	0.1	
C612	ECJ1VB1C473K	0.047	
C613	ECJ1VB1C473K	0.047	
C614	ECUV0J105KBV	1	S
C615	ECJ1VC1H331J	330p	
C617	ECJ1VC1H331J	330p	
C618	ECUV1C474KBV	0.47	
C619	ECUV1C474KBV	0.47	
C620	F1J0J1060006	10	
C621	ECJ1VF1E104Z	0.1	
C622	ECJ1VF1C104Z	0.1	
C623	F1J0J1060006	10	
C624	F1J0J1060006	10	
C625	ECJ1VF1C104Z	0.1	
C626	ECJ1VF1C104Z	0.1	
C627	ECJ1VB1H122K	0.0012	
C628	ECJ1VB1H122K	0.0012	
C629	ECUV0J105KBV	1	S

Ref. No.	Part No.	Part Name & Description	Remarks
C630	ECUV1E104ZFV	0.1	S
C631	F1J0J1060006	10	
C632	ECUV1A224KBV	0.22	S
C633	ECUV1E104ZFV	0.1	S
C634	ECUV0J105KBV	1	S
C635	ECUV0J105KBV	1	S
C636	ECUV0J105KBV	1	S
C637	ECUV0J105KBV	1	S
C638	ECUV0J105KBV	1	S
C639	PQCUV1A105KB	1	S
C640	ECJ1VF1C104Z	0.1	
C641	F1J0J1060006	10	
C642	F1J0J1060006	10	
C643	ECJ1VF1C104Z	0.1	
C645	ECJ0EC1H100D	10p	
C646	ECJ0EC1H100D	10p	
C647	ECJ0EC1H100D	10p	
C648	ECJ0EC1H100D	10p	
		(CONNECTORS AND JACKS)	
CN601	K4BC06B00047	JACK	
CN602	PFJJ1B01Z	JACK	S
CN603	PQJJ1D010Z	JACK	S
CN604	K2HC103B0061	JACK	
CN605	K2LC108B0046	JACK	
CN606	PQJS33A62Z	CONNECTOR,33P	
CN607	K1KA02AA0229	CONNECTOR,2P	
		(THERMISTOR)	
IP601	D4FBR200A003	FUSE	
		(COILS AND CERAMIC FILTER)	
L601	G0B150G00002	COIL	
L602	G1C6R8Z00005	COIL	
L603	J0JCC0000079	CERAMIC FILTER	
L604	J0JCC0000079	CERAMIC FILTER	
L605	J0JCC0000079	CERAMIC FILTER	
L606	G1C100K00031	COIL	
L608	PQLQR1RS241	COIL	S
L609	J0JCC0000079	CERAMIC FILTER	
L610	J0JCC0000079	CERAMIC FILTER	
L611	J0JCC0000079	CERAMIC FILTER	
L612	J0JCC0000079	CERAMIC FILTER	
R642	J0JCC0000079	CERAMIC FILTER	
R643	J0JCC0000079	CERAMIC FILTER	
R644	J0JCC0000079	CERAMIC FILTER	
R641	PQLQR1RS241	COIL	S
		(RESISITORS)	
R601	ERJ3GEYJ750	75	
R602	ERJ3GEYJ750	75	
R603	ERJ3GEYJ222	2.2k	
R604	ERJ3GEYJ222	2.2k	
R606	ERJ3GEYJ102	1k	
R607	ERJ3GEYJ102	1k	
R608	PQ4R18XJ100	10	S
R609	ERJ3GEY0R00	0	

Ref. No.	Part No.	Part Name & Description	Remarks
R610	ERJ3GEYJ103	10k	
R611	ERJ3GEYJ103	10k	
R612	ERJ3GEYJ473	47k	
R613	ERJ3GEYJ203	20k	
R614	ERJ3GEYJ154	150k	
R615	ERJ3GEYJ750	75	
R616	ERJ3GEYJ750	75	
R617	ERJ3GEYJ154	150k	
R618	ERJ3GEYJ680	68	
R619	ERJ3GEYJ820	82	
R621	ERJ3GEYJ332	3.3k	
R622	ERJ3GEYJ332	3.3k	
R623	ERJ3GEYJ105	1M	
R624	ERJ3GEYJ105	1M	
R625	ERJ3GEYJ203	20k	
R626	ERJ3GEYJ203	20k	
R627	ERJ3GEYJ103	10k	
R628	ERJ3GEYJ103	10k	
R629	ERJ3GEYJ104	100k	
R630	ERJ3GEYJ105	1M	
R631	ERJ3GEYJ104	100k	
R632	ERJ3GEYJ104	100k	
R633	ERJ3GEY0R00	0	
R634	ERJ3GEY0R00	0	
R635	ERJ3GEY0R00	0	
R636	ERJ3GEY0R00	0	
R637	ERJ3GEY0R00	0	
R645	ERJ3GEYJ561	560	
		(VARISTORS)	
SA601	D4ZZ00000024	VARISTOR (SAUGE ABSORBER)	
SA602	D4ZZ00000024	VARISTOR (SAUGE ABSORBER)	
SA603	D4ZZ00000024	VARISTOR (SAUGE ABSORBER)	
SA604	D4ZZ00000024	VARISTOR (SAUGE ABSORBER)	
SA605	D4ZZ00000024	VARISTOR (SAUGE ABSORBER)	
SA606	D4ZZ00000024	VARISTOR (SAUGE ABSORBER)	
SA607	D4ZZ00000024	VARISTOR (SAUGE ABSORBER)	
SA608	D4ZZ00000024	VARISTOR (SAUGE ABSORBER)	
		(TRANSFORMER)	
T601	G5B1C0000011	TRANSFORMER	

18.5. SUB BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB3	PSWP3HCM311A	SENSOR BOARD ASS'Y (RTL)	
IC71	B3NAA0000003	IC	
		(TRANSISTORS)	
Q71	PQVTDTC143E	TRANSISTOR(SI)	S
		(CAPACITORS)	
C71	ECJ1VF1A105Z	1	
C72	ECJ1VF1C104Z	0.1	
		(CONNECTORS)	
CN71	K1MN08B00012	CONNECTOR, 8P	
CN72	K1MN04B00042	CONNECTOR, 4P	
		(COILS)	
L71	PQLQR1RS601T	COIL	S
L72	PQLQR1RS601T	COIL	S
L73	PQLQR1RS601T	COIL	S
L74	PQLQR1RS601T	COIL	S
		(RESISITORS)	
R71	ERJ3GEY0R00	0	
R72	ERJ3GEY0R00	0	
R73	ERJ3GEYJ101	100	

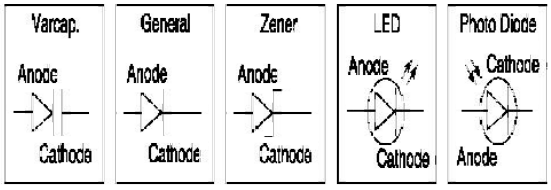
18.6. GREASE

Ref. No.	Part No.	Part Name & Description
	PSZYC10A	GREASE

19. FOR THE SCHEMATIC DIAGRAM

Note:

1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.
2. The schematic diagrams and circuit board may be modified at any time with the development of new technology.



Important safety notice
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of there components, use only manufacturer's specified parts.

20. SCHEMATIC DIAGRAM

20.1. WAVEFORM

21. CIRCUIT BOARD

21.1. MAIN BOARD (COMPONENT VIEW)

21.2. MAIN BOARD (BOTTOM VIEW)

21.3. I/O BOARD (COMPONENT VIEW)

21.4. I/O BOARD (BOTTOM VIEW)

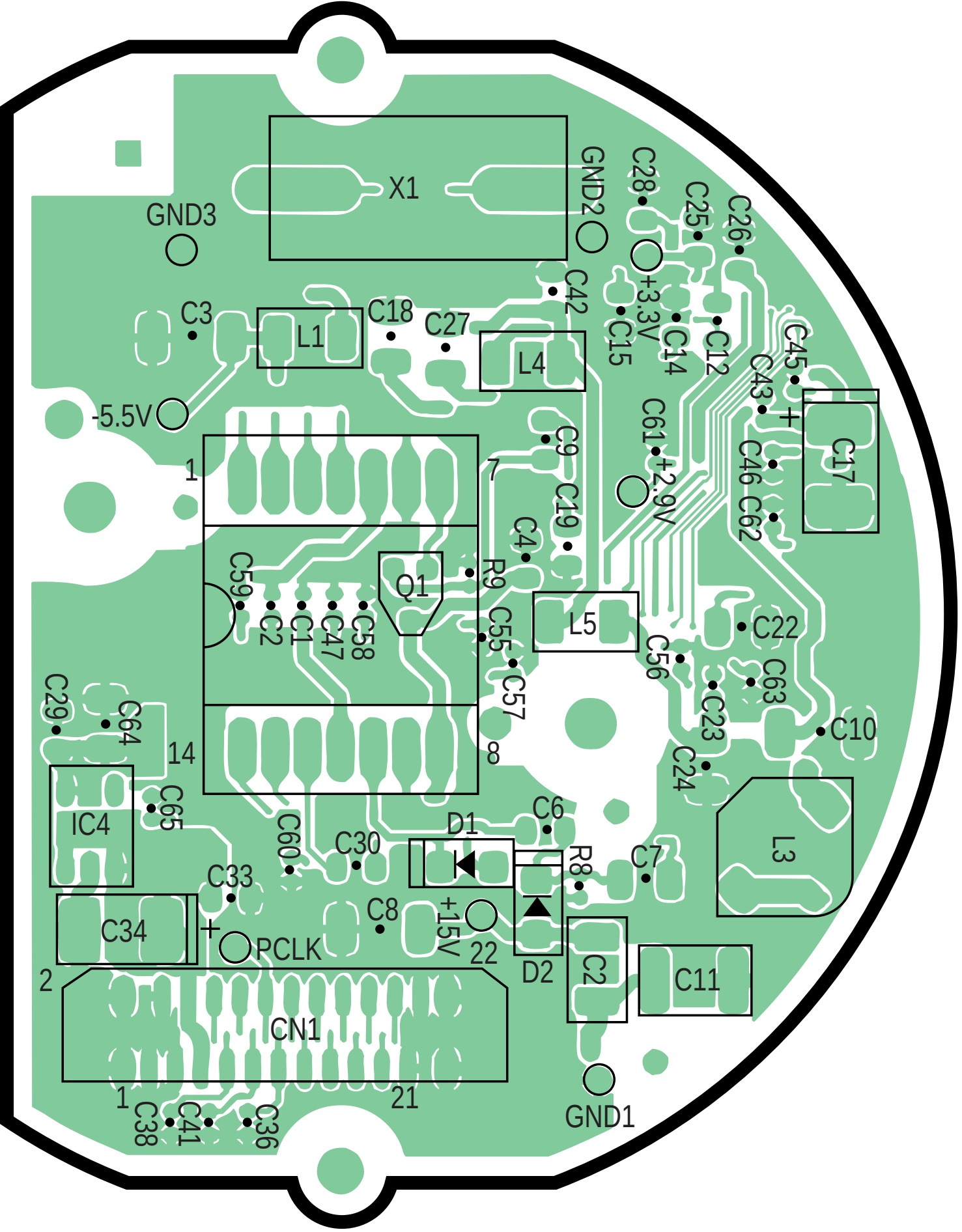
21.5. SENSOR BOARD (COMPONENT VIEW)

21.6. SENSOR BOARD (BOTTOM VIEW)

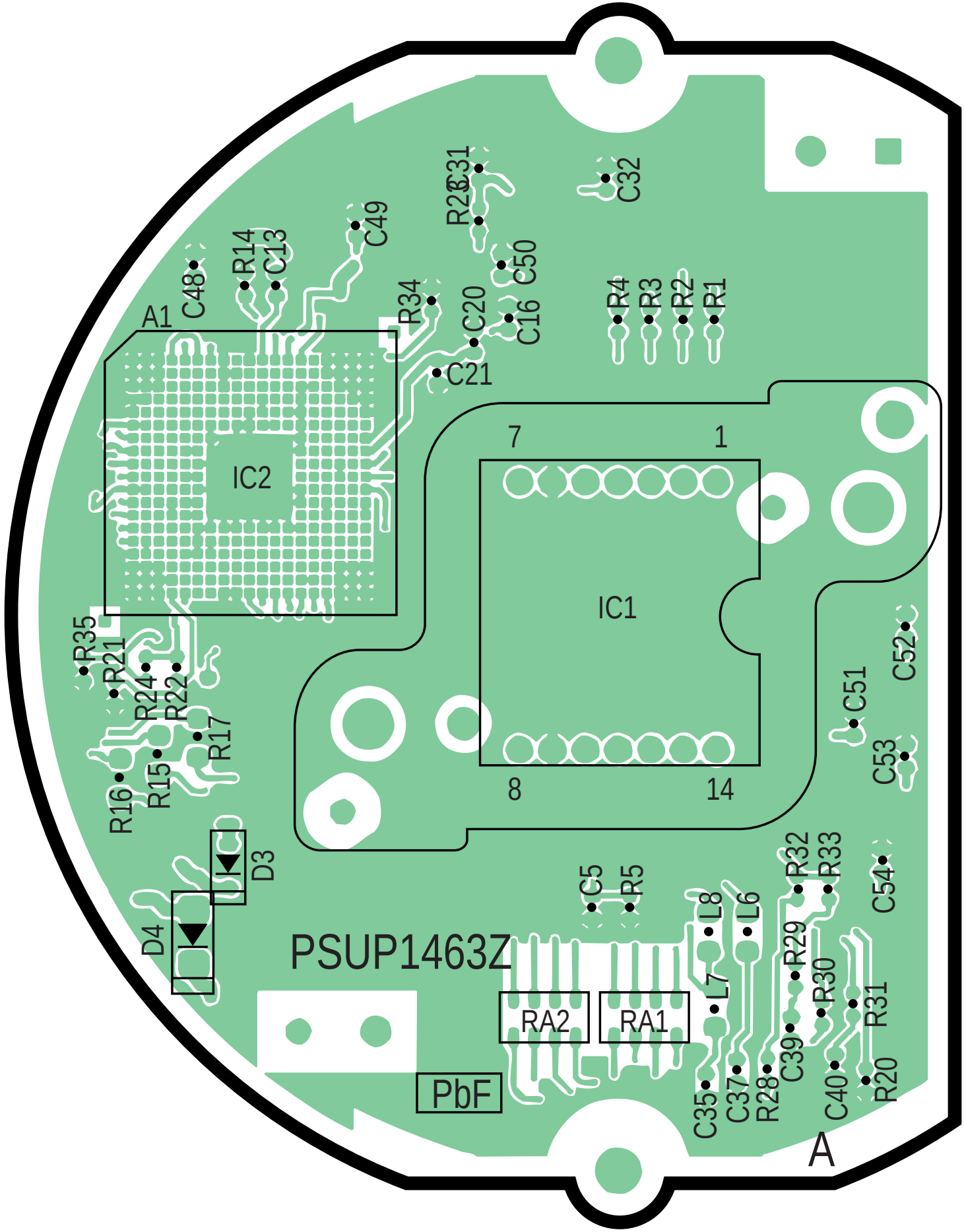
21.7. CAMERA BOARD (COMPONENT VIEW)

21.8. CAMERA BOARD (BOTTOM VIEW)

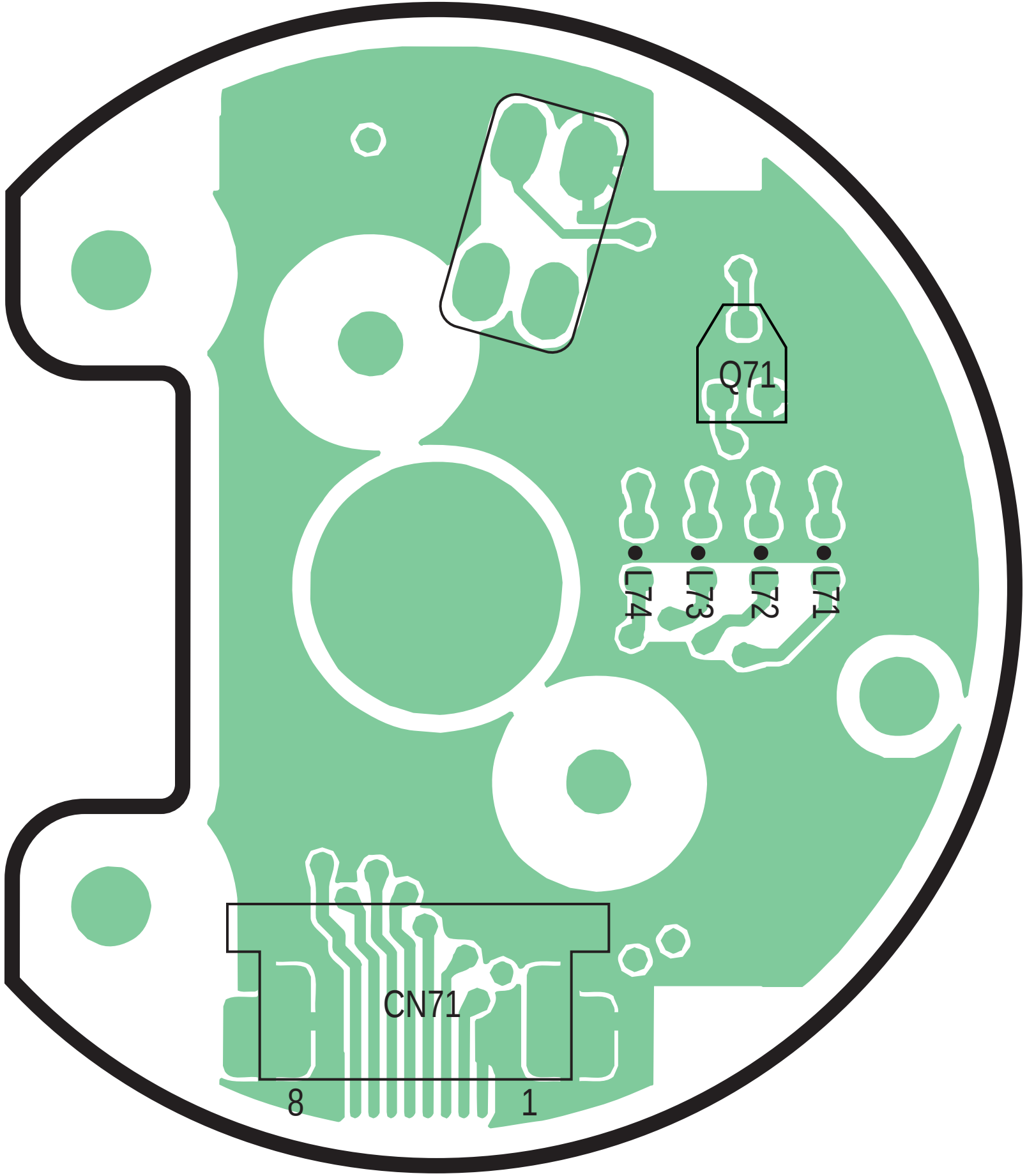
A / BBHCM311CE / BBHCM311E



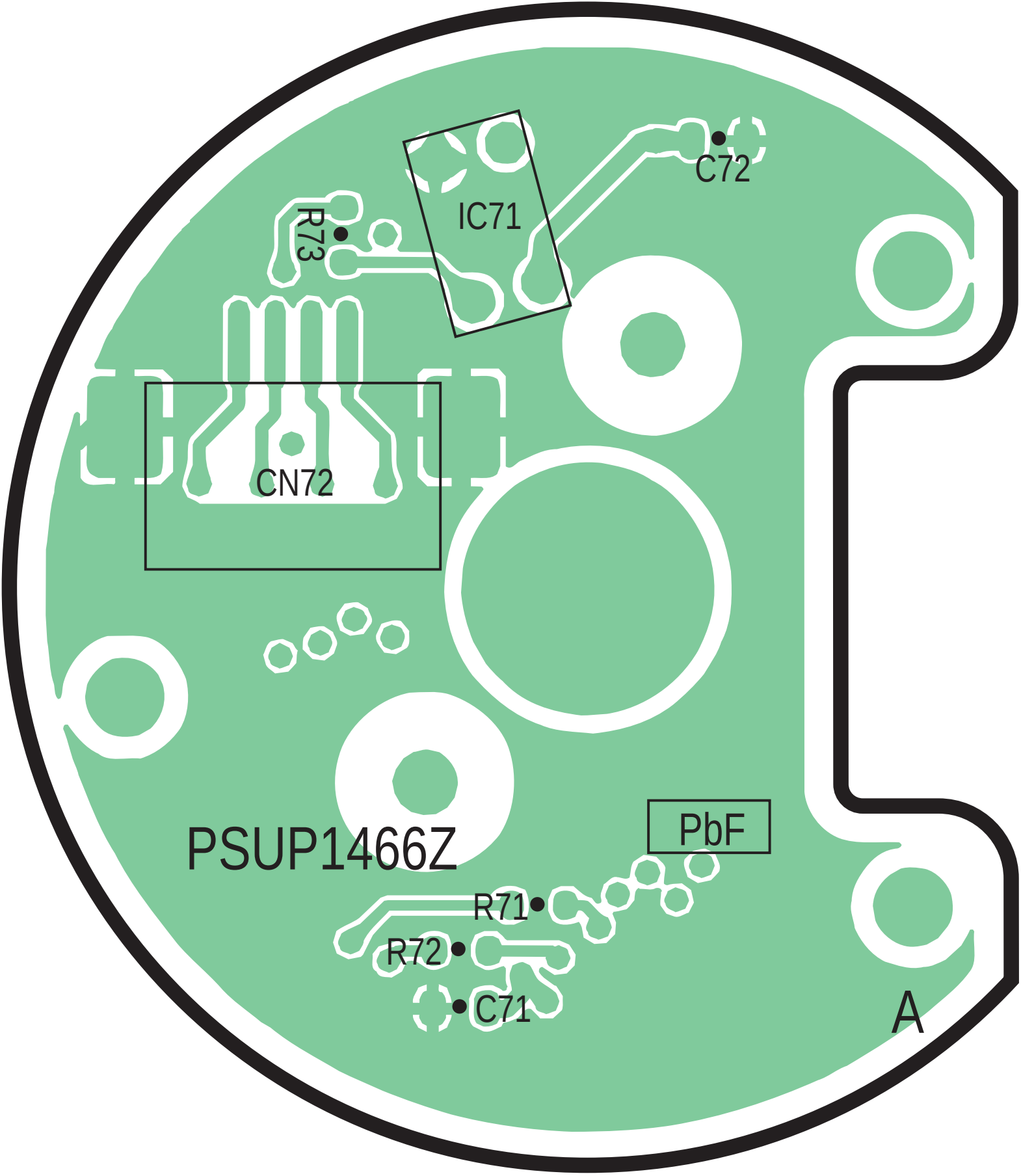
BB-HCM311 CAMERA BOARD



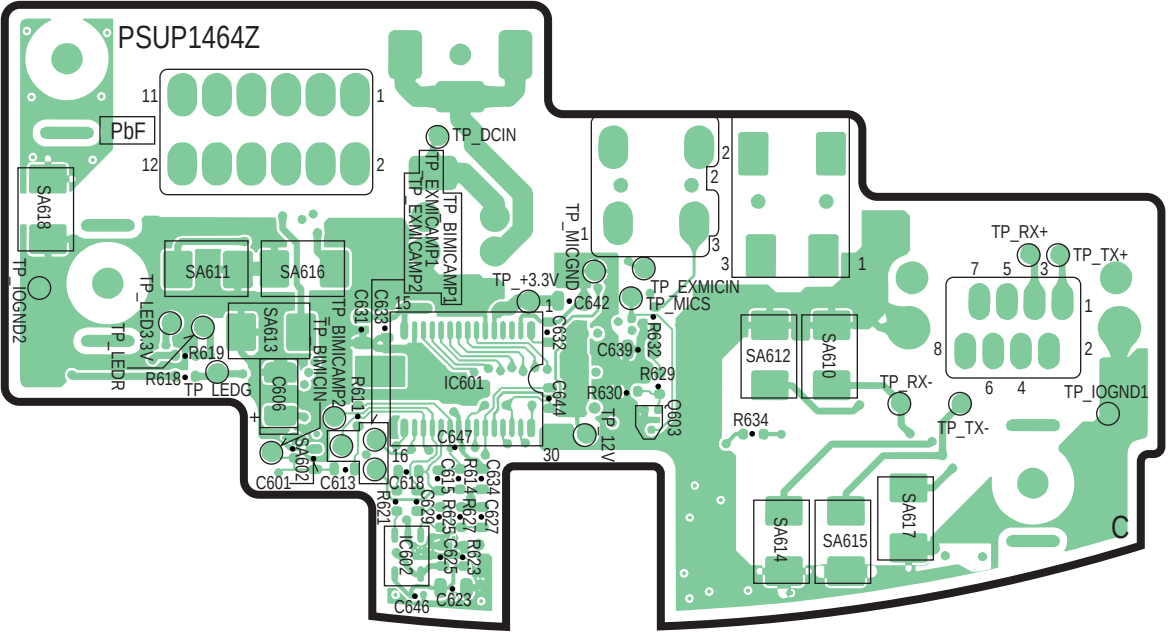
BB-HCM311 CAMERA BOARD



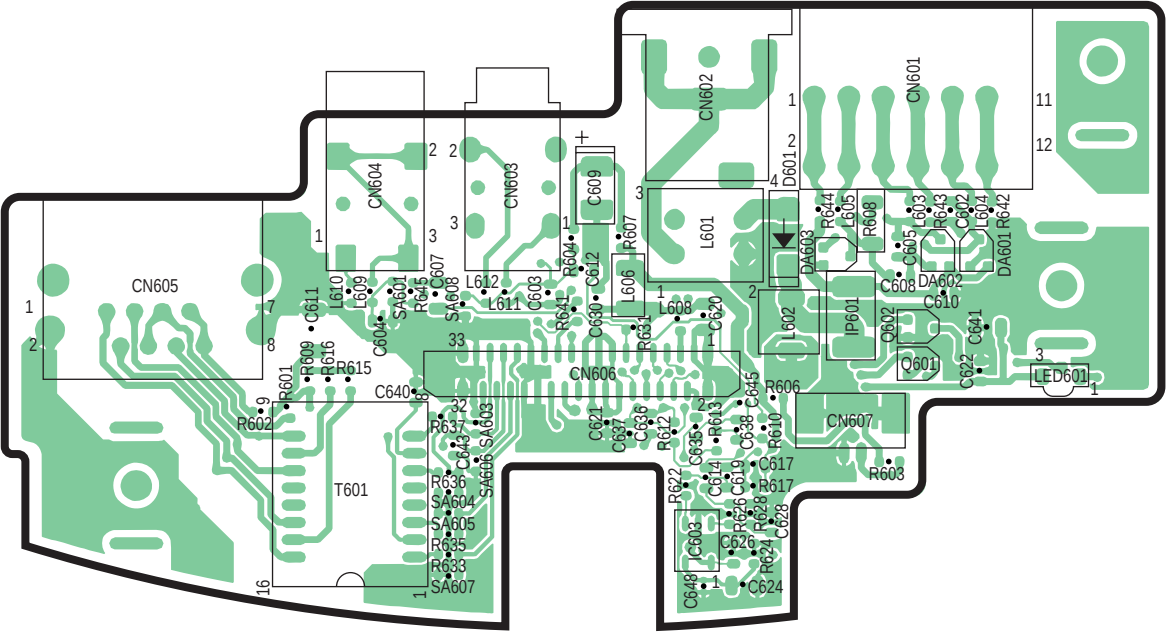
BB-HCM311 SENSOR BOARD



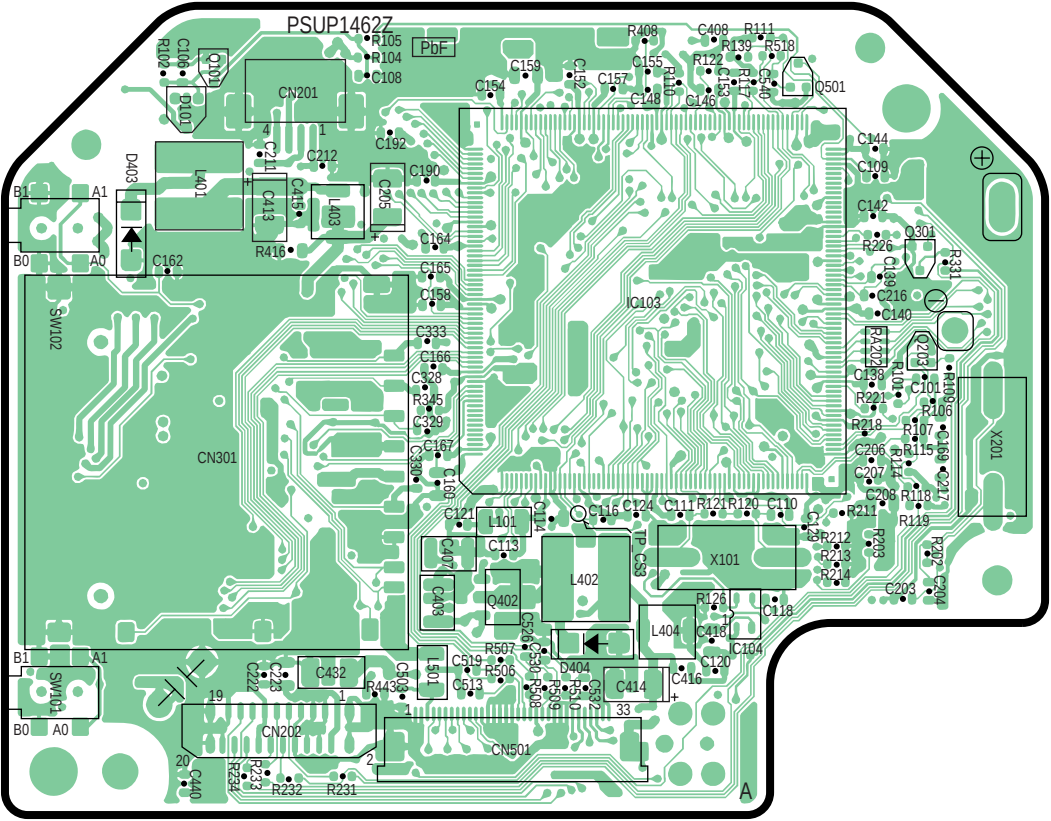
BB-HCM311 SENSOR BOARD

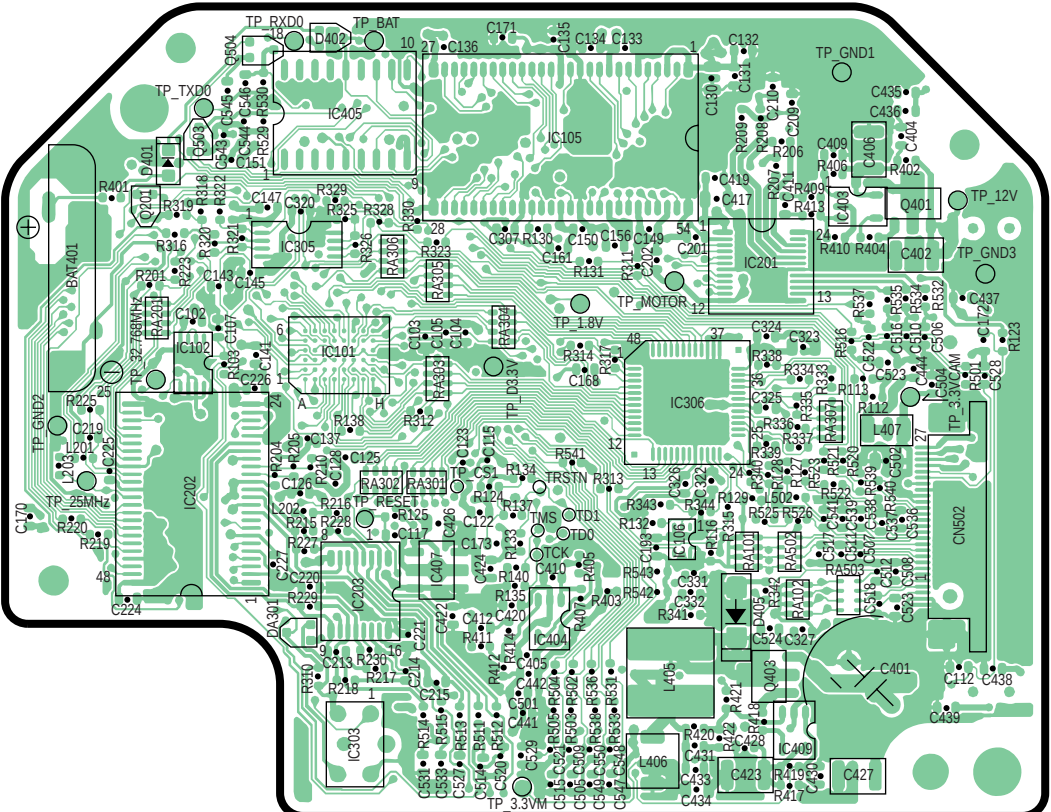


BB-HCM311 I/O BOARD

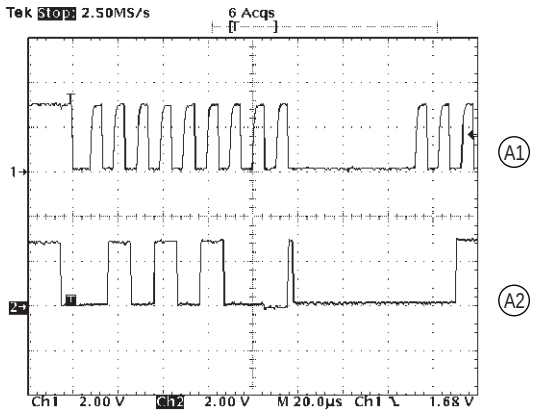


BB-HCM311 I/O BOARD


PSUP1462Z
PbF
CN201
CN301
CN202
CN501
IC103
IC104
X101
X201
Q501
Q301
Q402
L401
L402
L403
L404
D403
D404
SW101
SW102
A
BB-HCM311 MAIN BOARD

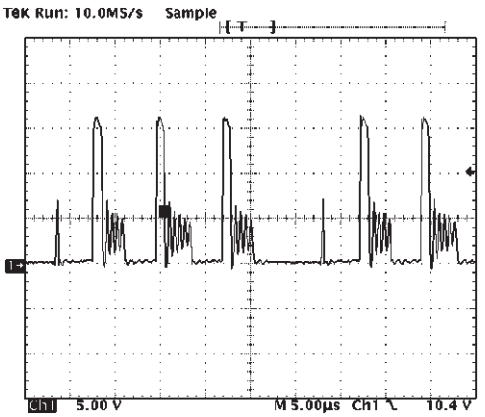


BB-HCM311 MAIN BOARD

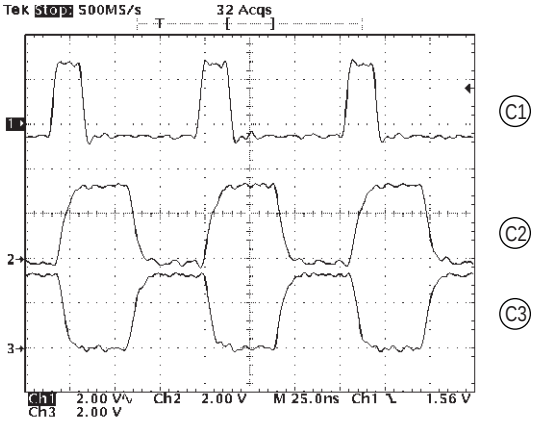


A1

A2



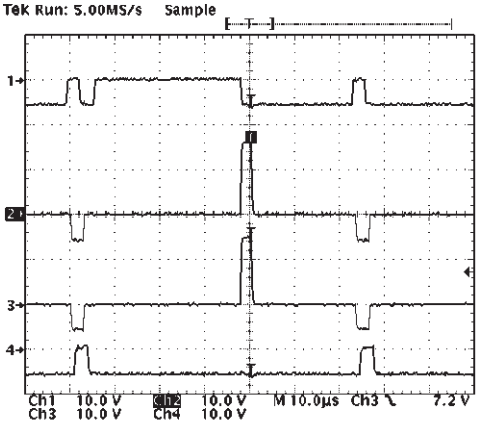
B



C1

C2

C3

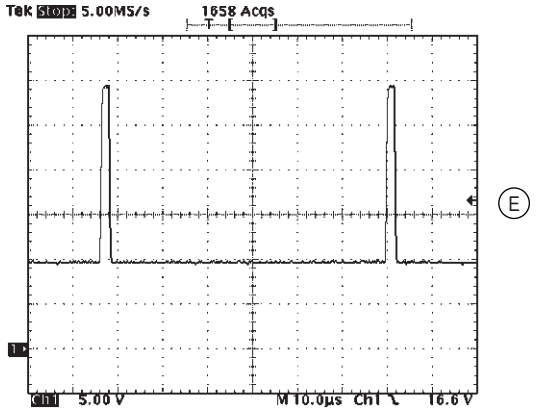


D1

D2

D3

D4



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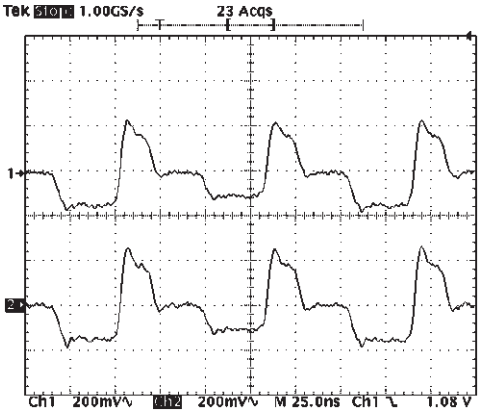
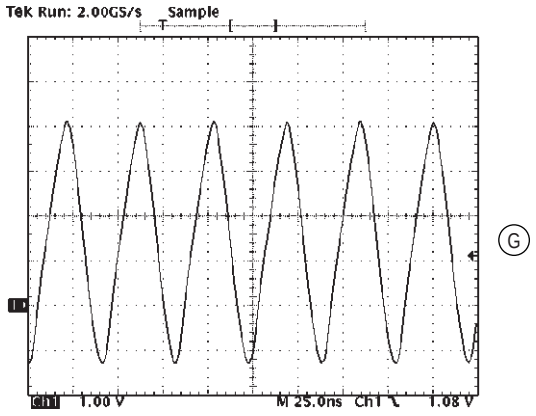


F1

F2



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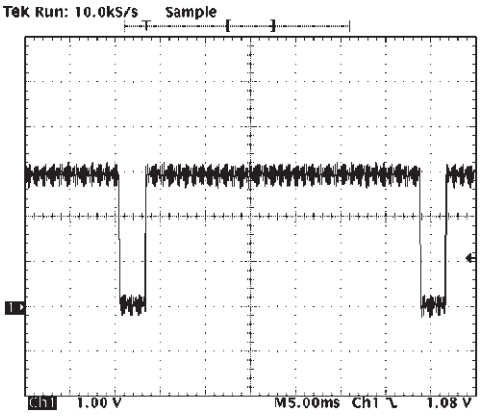
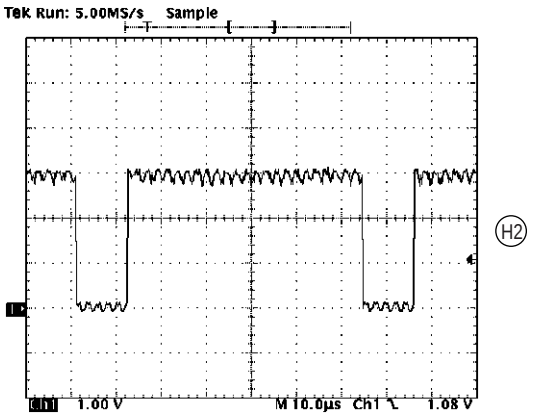
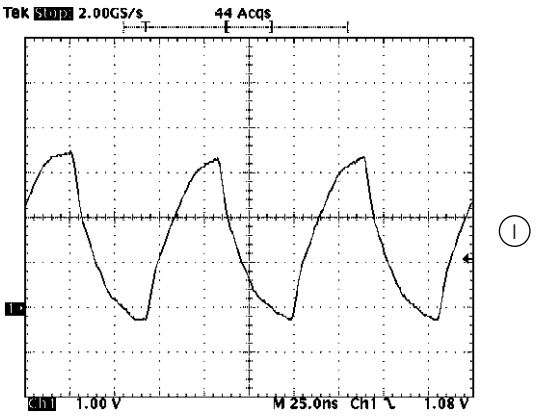


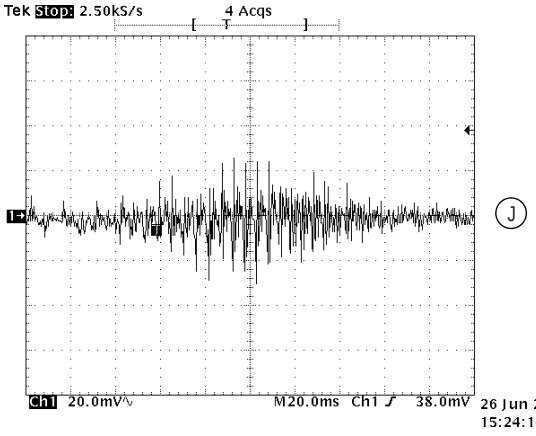
H1


Tek Run: 5.00MS/s Sample
Ch1 1.00 V
M 10.0µs Ch1 ∿ 1.08 V

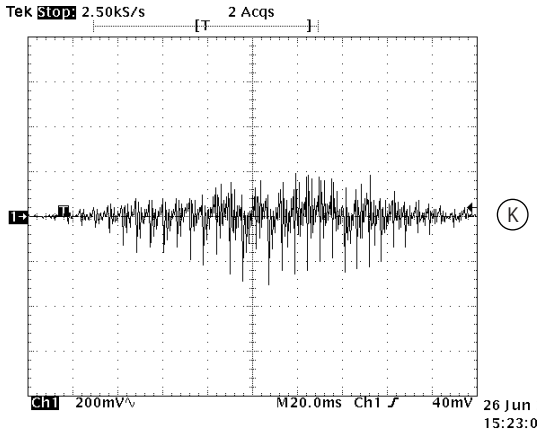
H2


Tek Stop: 2.00GS/s 44 Acqs
Ch1 1.00 V
M 25.0ns Ch1 ∿ 1.08 V

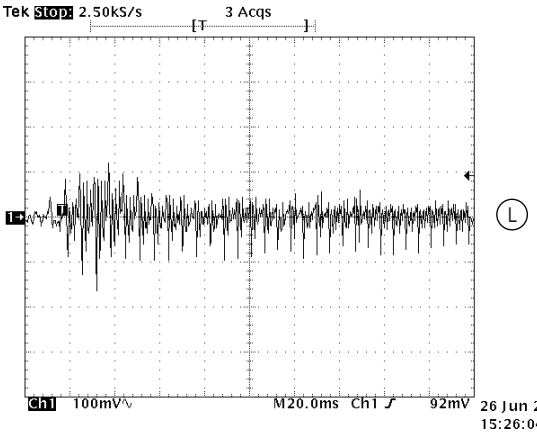
I


Tek Stop: 2.50kS/s 4 Acqs
Ch1 20.0mV∿
M20.0ms Ch1 ƒ 38.0mV
26 Jun 2004
15:24:14

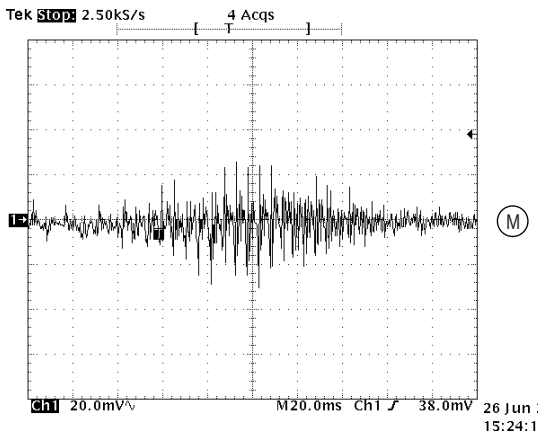
J


Tek Stop: 2.50kS/s 2 Acqs
Ch1 200mV∿
M20.0ms Ch1 ƒ 40mV
26 Jun 2004
15:23:06

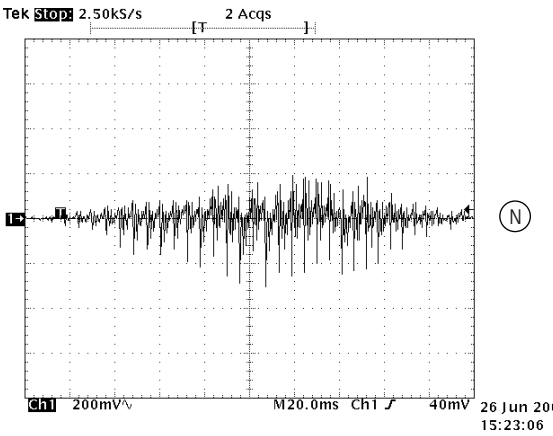
K


Tek Stop: 2.50kS/s 3 Acqs
Ch1 100mV∿
M20.0ms Ch1 ƒ 92mV
26 Jun 2004
15:26:04

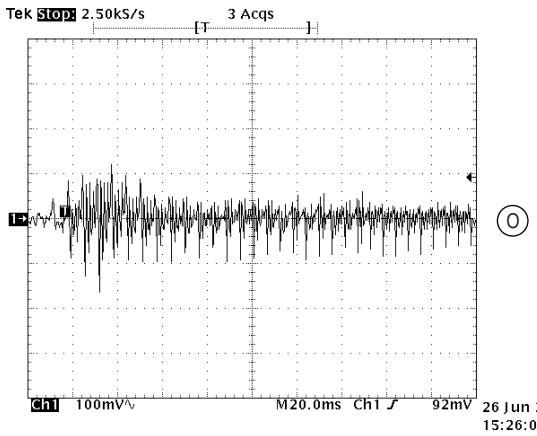
L


Tek Stop: 2.50kS/s 4 Acqs
Ch1 20.0mV∿
M20.0ms Ch1 ƒ 38.0mV
26 Jun 2004
15:24:14

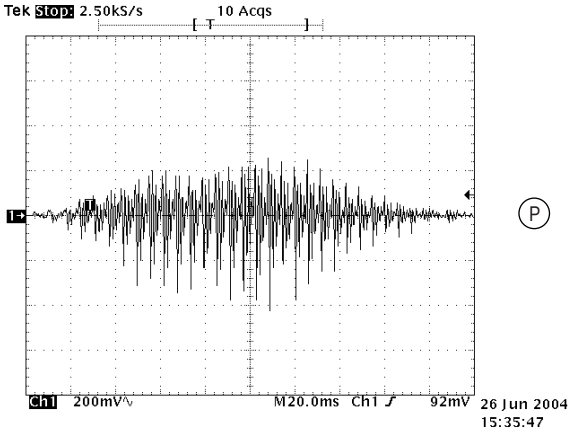
M


Tek Stop: 2.50kS/s 2 Acqs
Ch1 200mV∿
M20.0ms Ch1 ƒ 40mV
26 Jun 2004
15:23:06

N


Tek Stop: 2.50kS/s 3 Acqs
Ch1 100mV∿
M20.0ms Ch1 ƒ 92mV
26 Jun 2004
15:26:04

O



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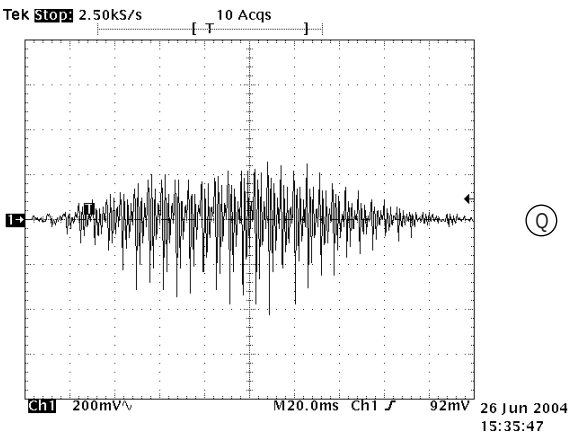

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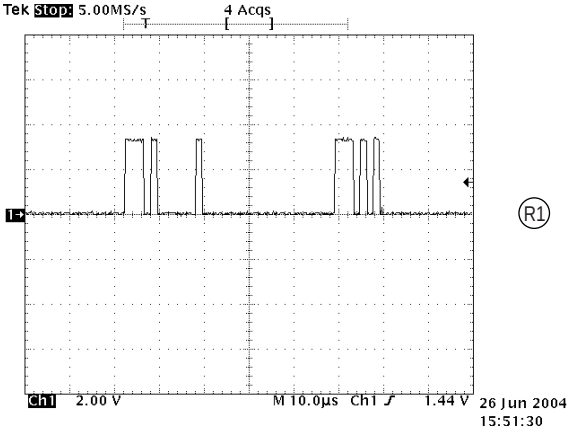
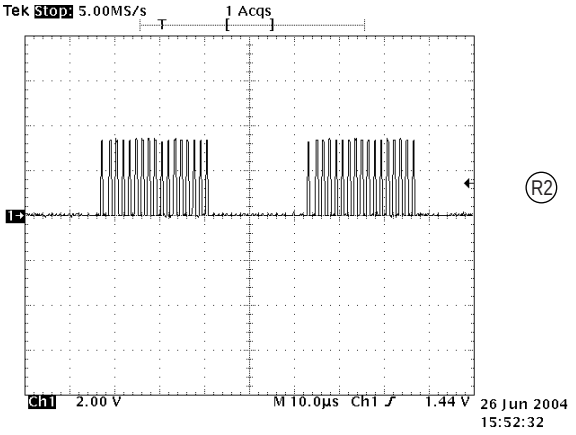


R1



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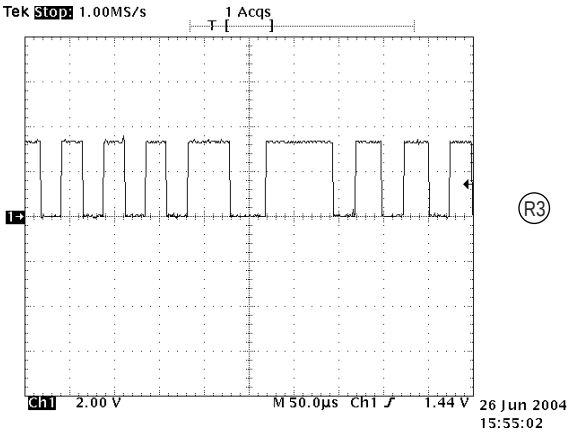

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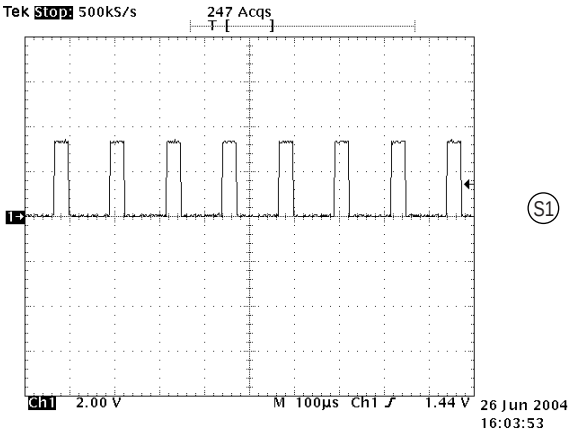
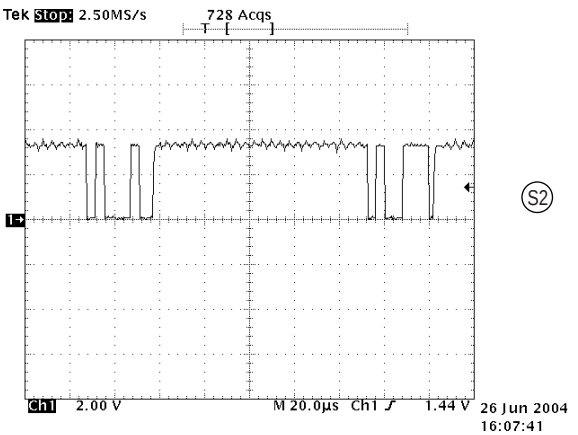
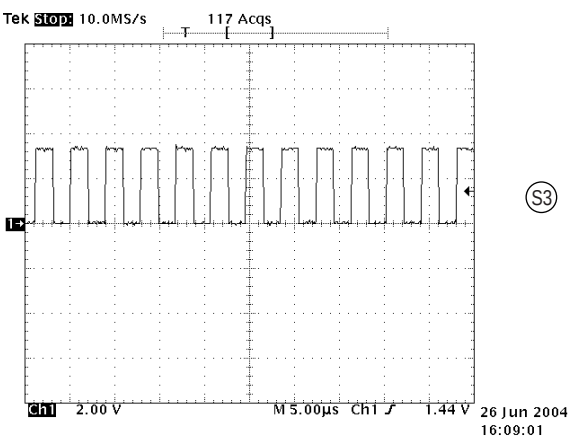


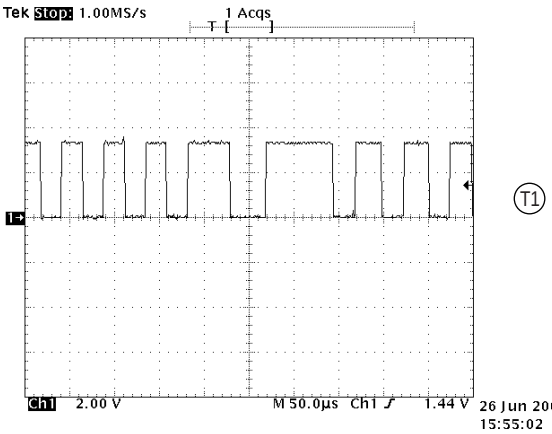
S1



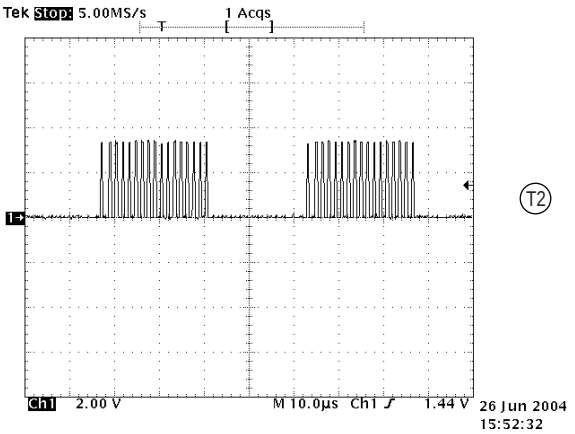
S2



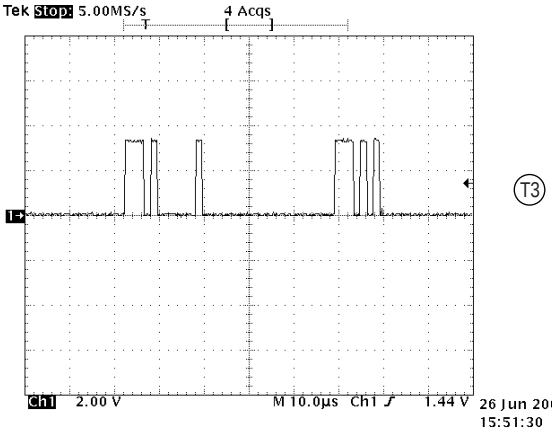
S3



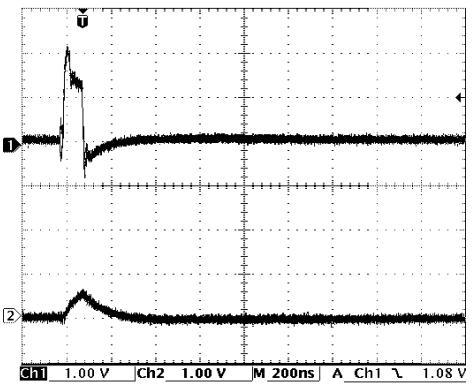
T1



T2



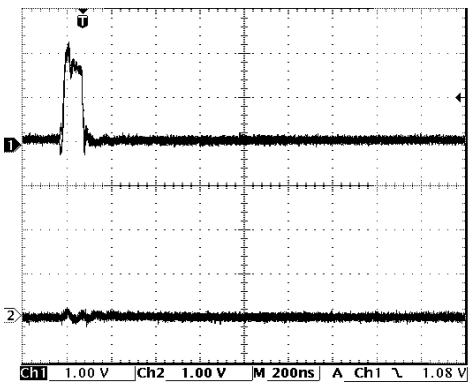
T3



U1

U2

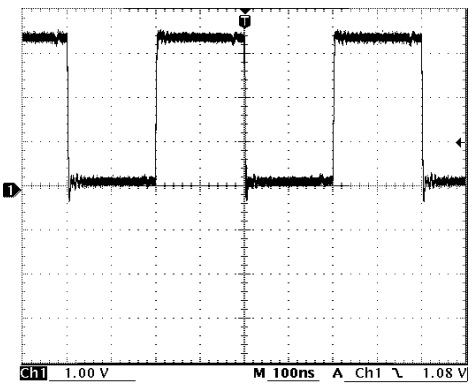
10Base Hub Connection (un-communicating)



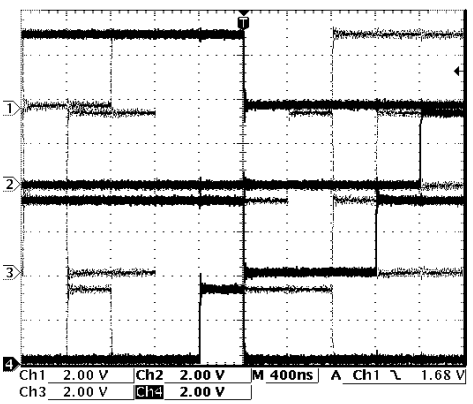
U3

U4

10Base Hub Connection (un-communicating)



U5



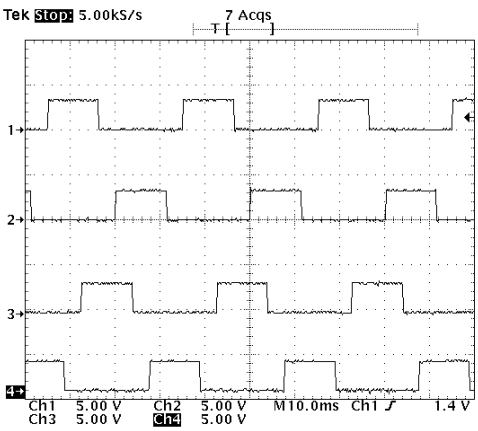
U6

U7

U8

U9

10Base Hub Connection (Communicating)

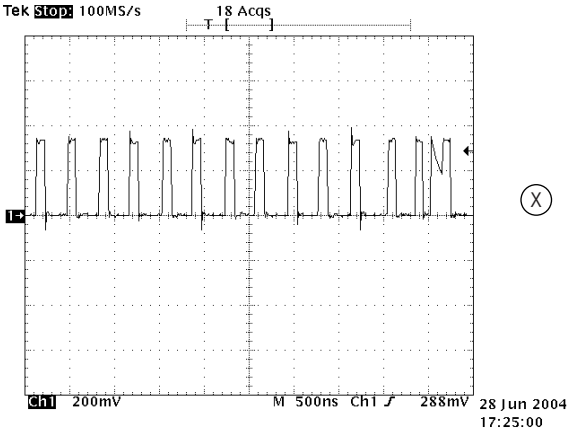


V1 W1

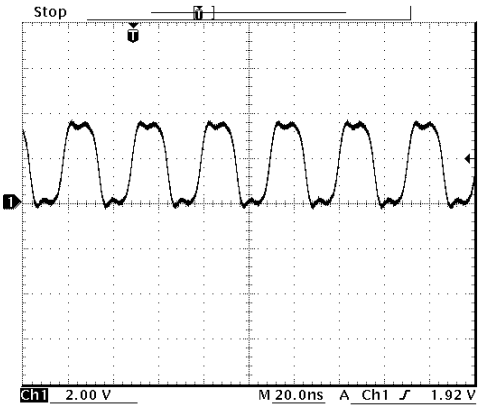
V2 W2

V3 W3

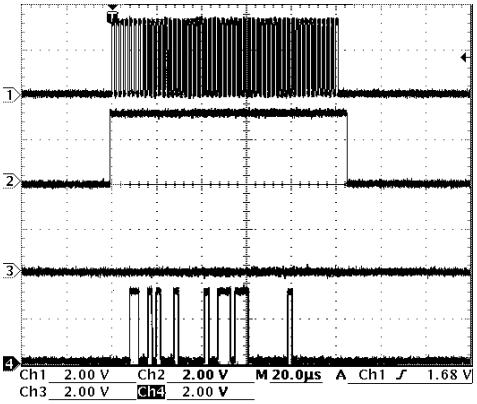
V4 W4


Tek Stop: 100MS/s
18 Acqs
Ch1 200mV
M 500ns Ch1 ƒ 288mV
28 Jun 2004
17:25:00

X


Stop
Ch1 2.00 V
M 20.0ns A Ch1 ƒ 1.92 V

X

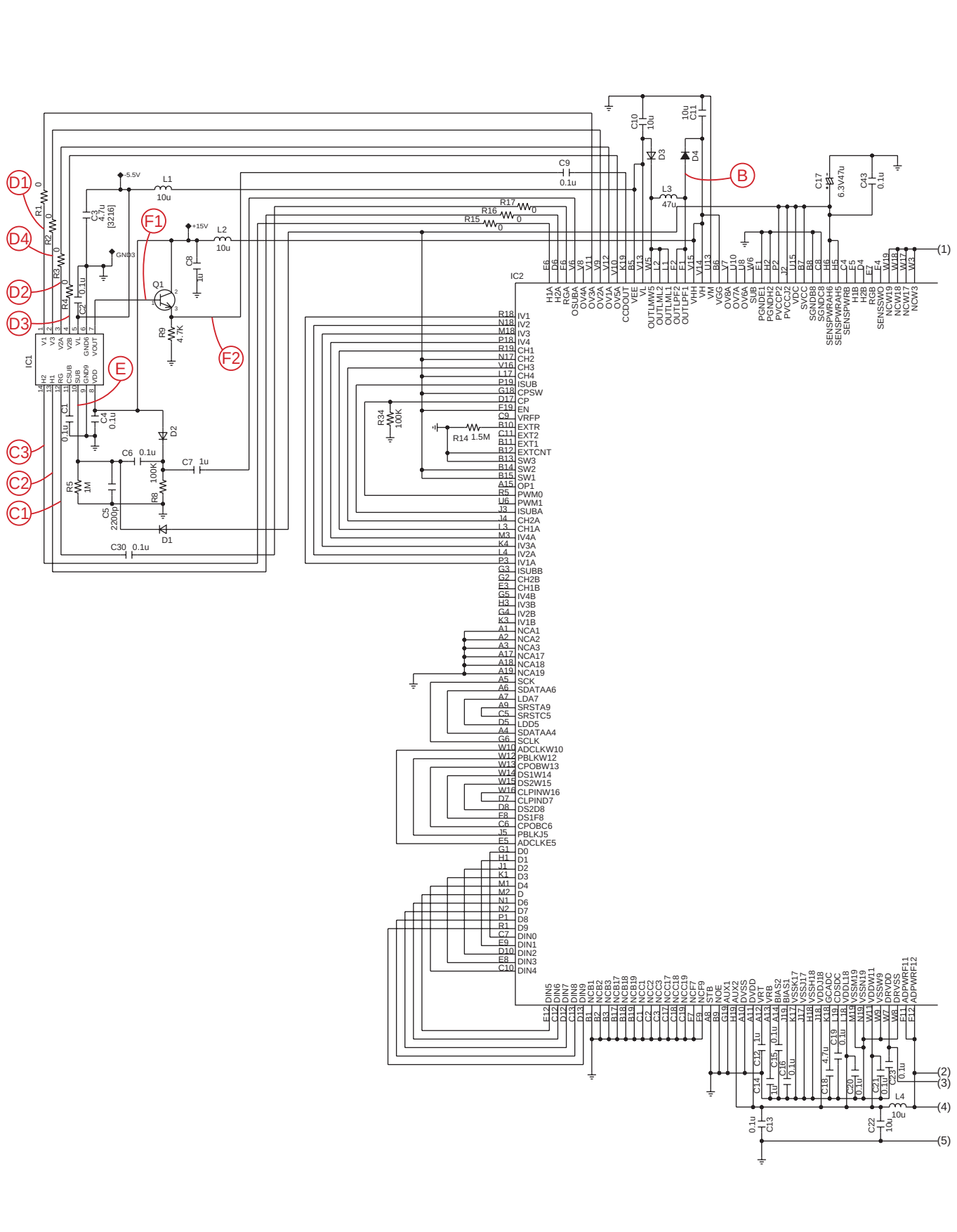

Ch1 2.00 V
Ch2 2.00 V
M 20.0µs
A Ch1 ƒ 1.68 V
Ch3 2.00 V
Ch4 2.00 V

Z2

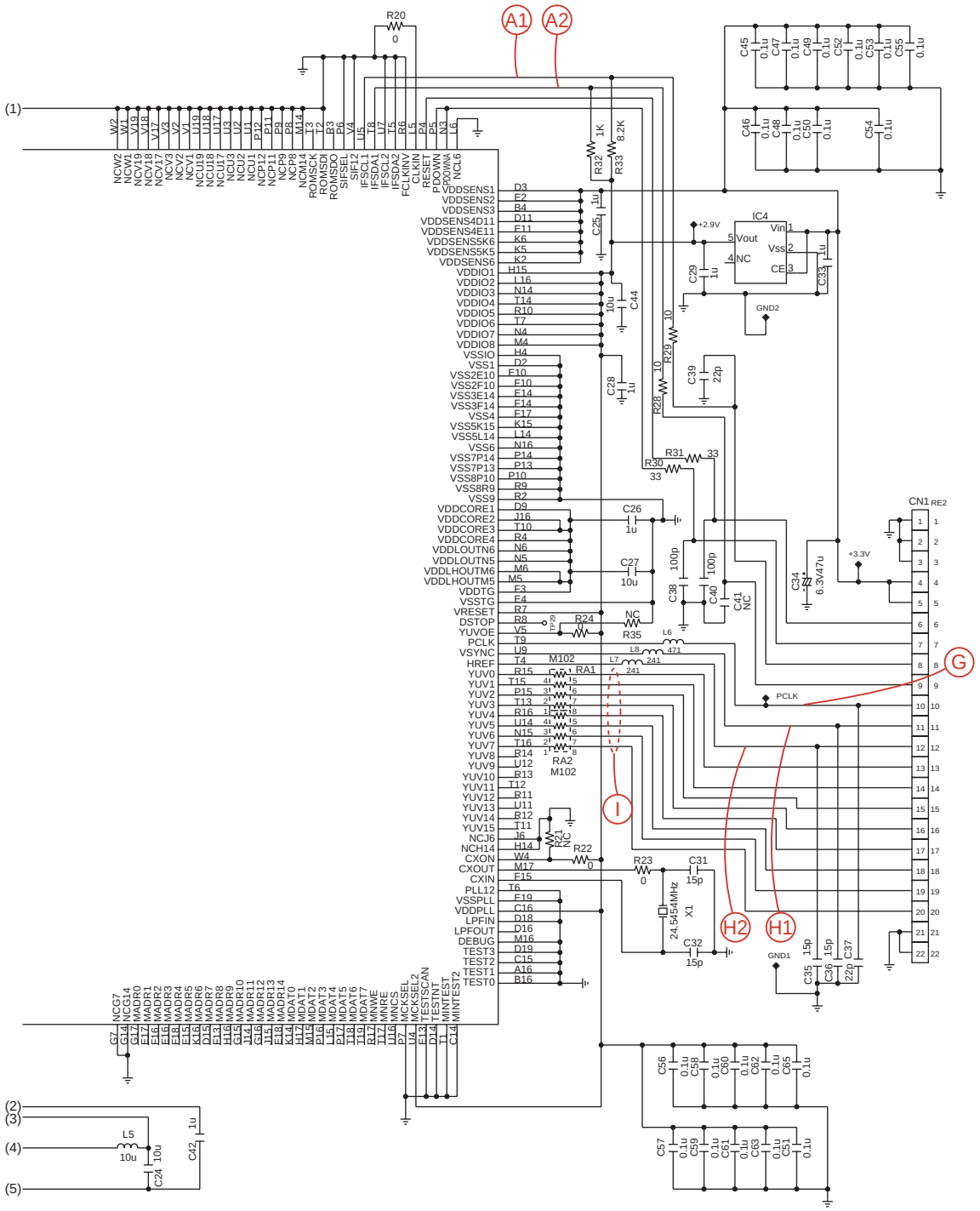
Z3

Z4

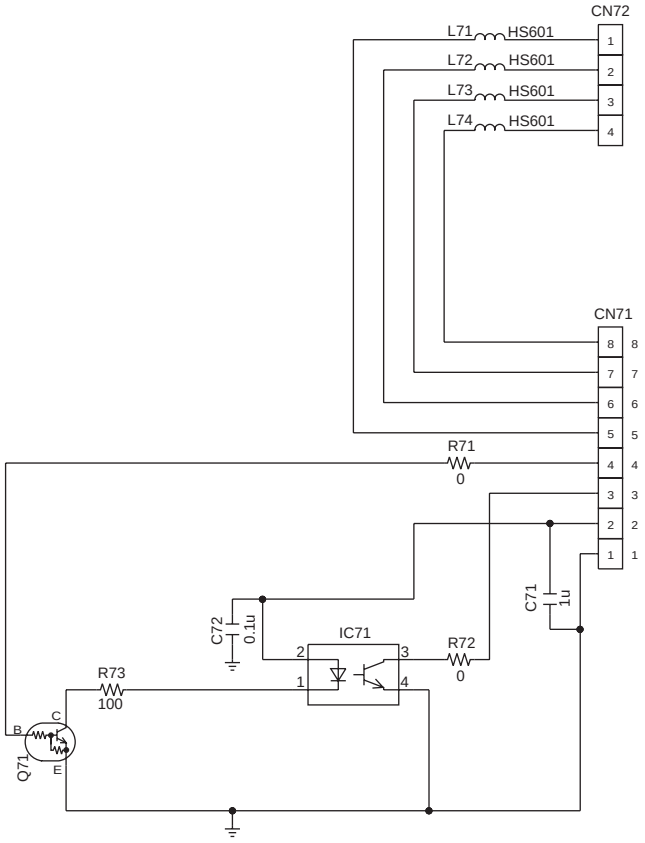
Z5

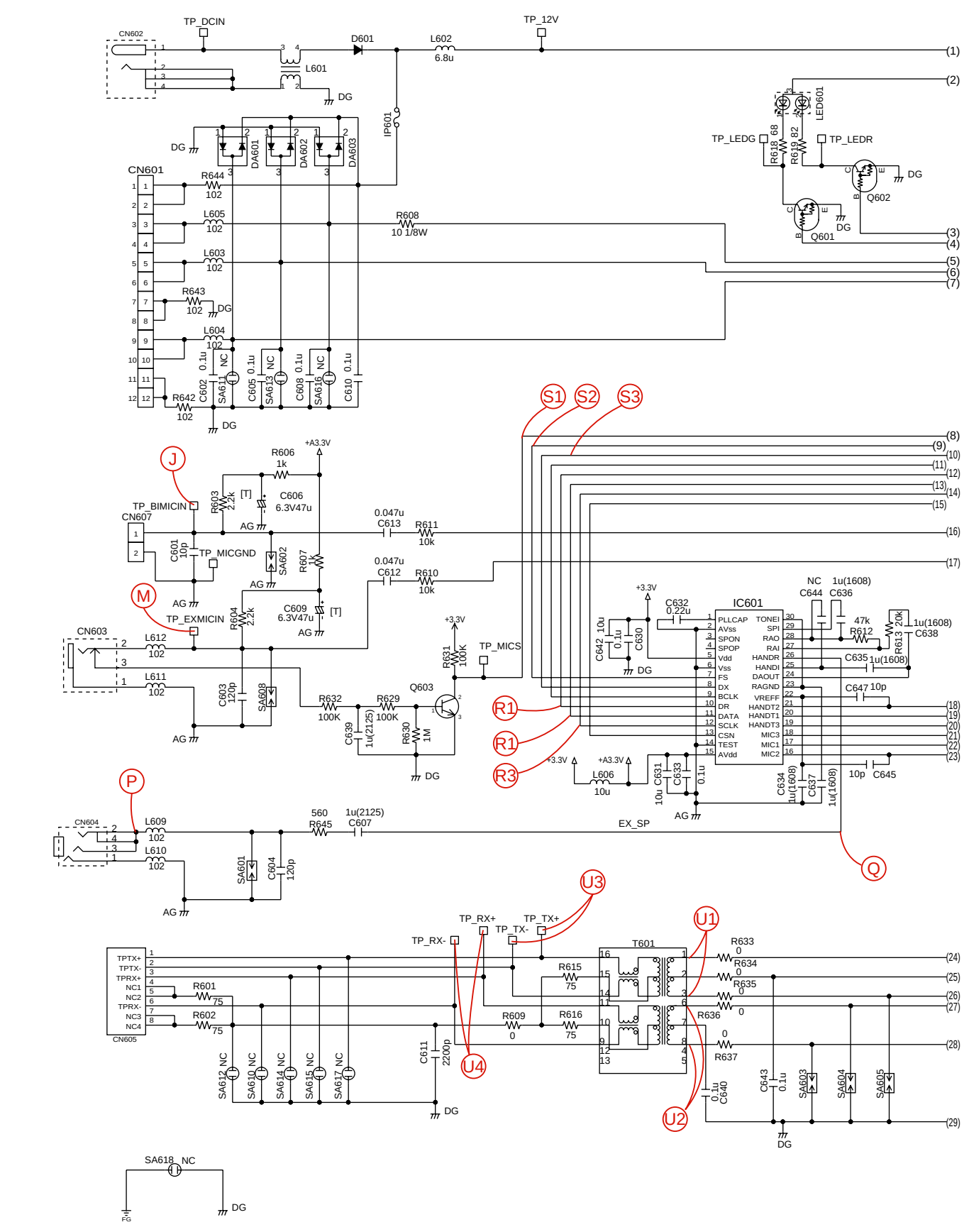


BB-HCM311 CAMERA BOARD (1/2)

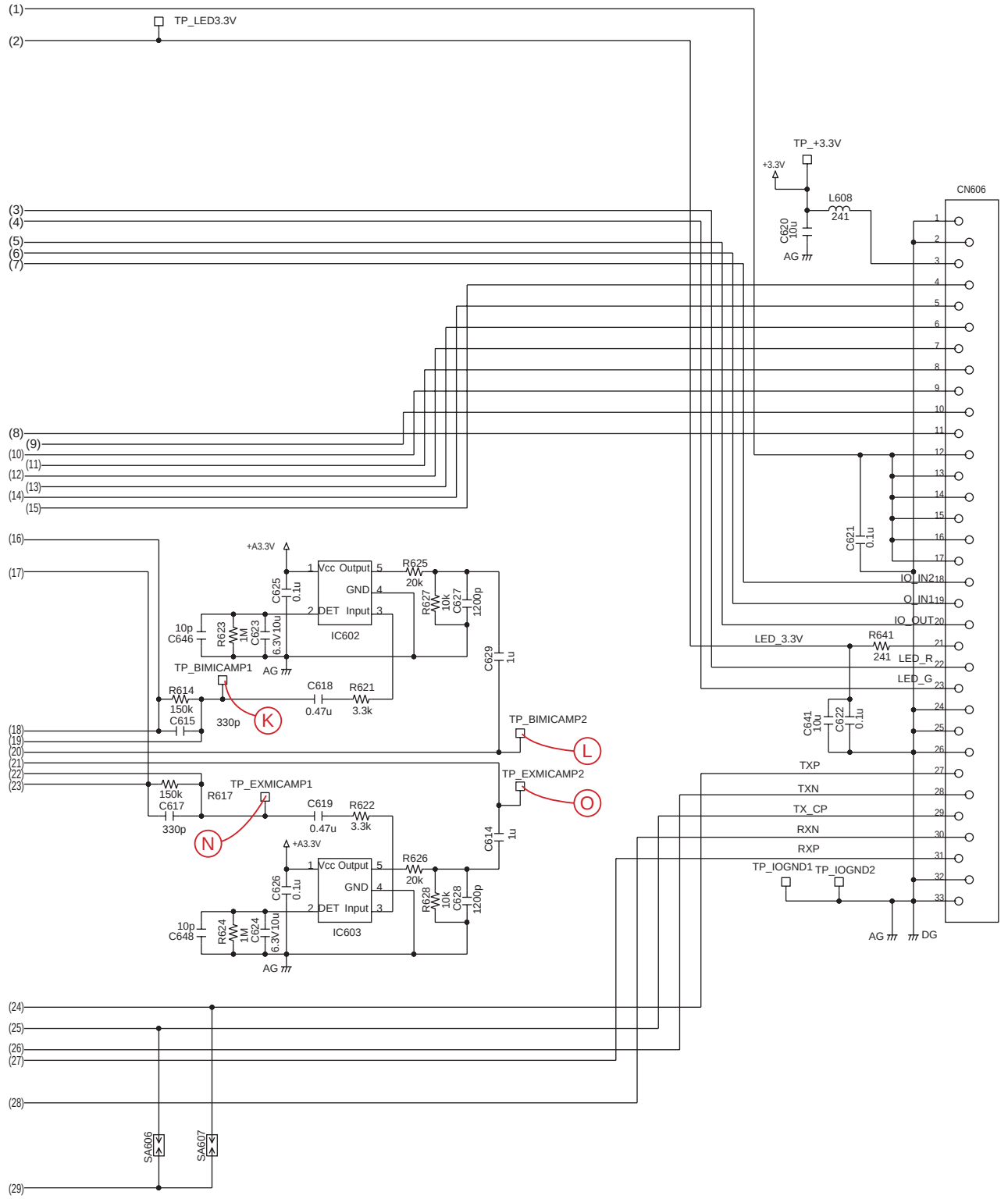


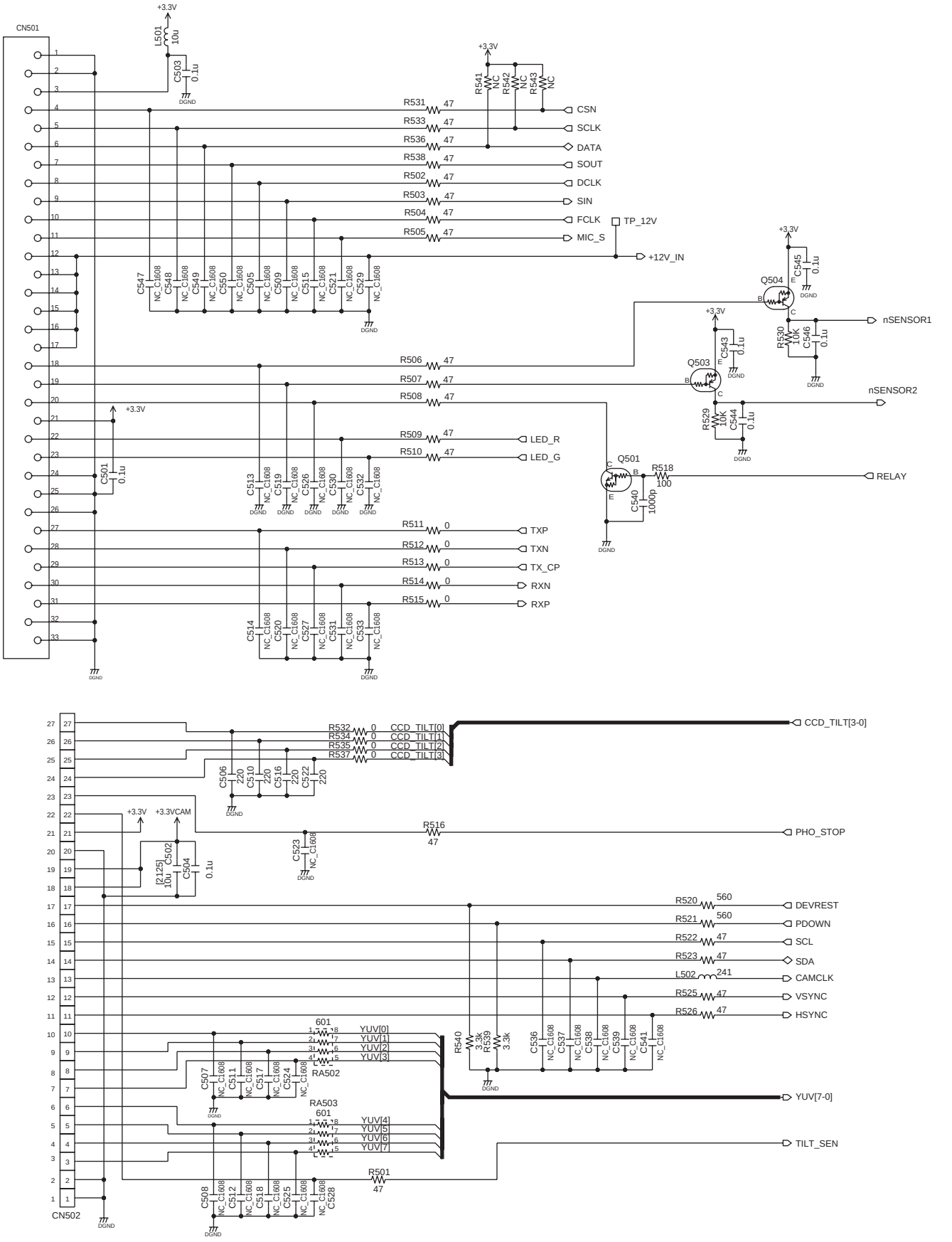
BB-HCM311 CAMERA BOARD (1/2)

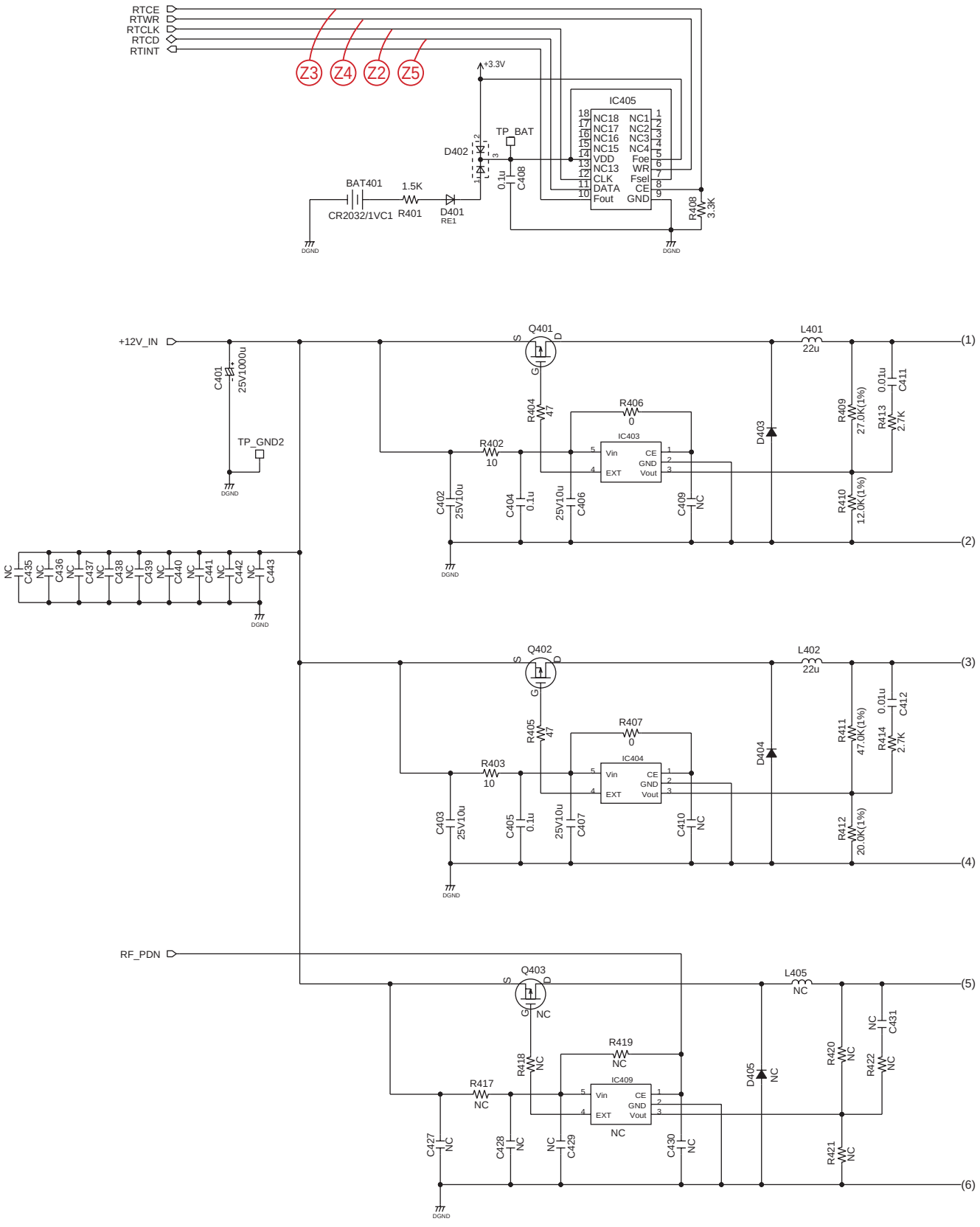

CN72
L71 HS601
L72 HS601
L73 HS601
L74 HS601
1
2
3
4
CN71
8 8
7 7
6 6
5 5
4 4
3 3
2 2
1 1
R71
0
C71
1u
C72
0.1u
IC71
2
3
1
4
R72
0
R73
100
B
C
E
Q71



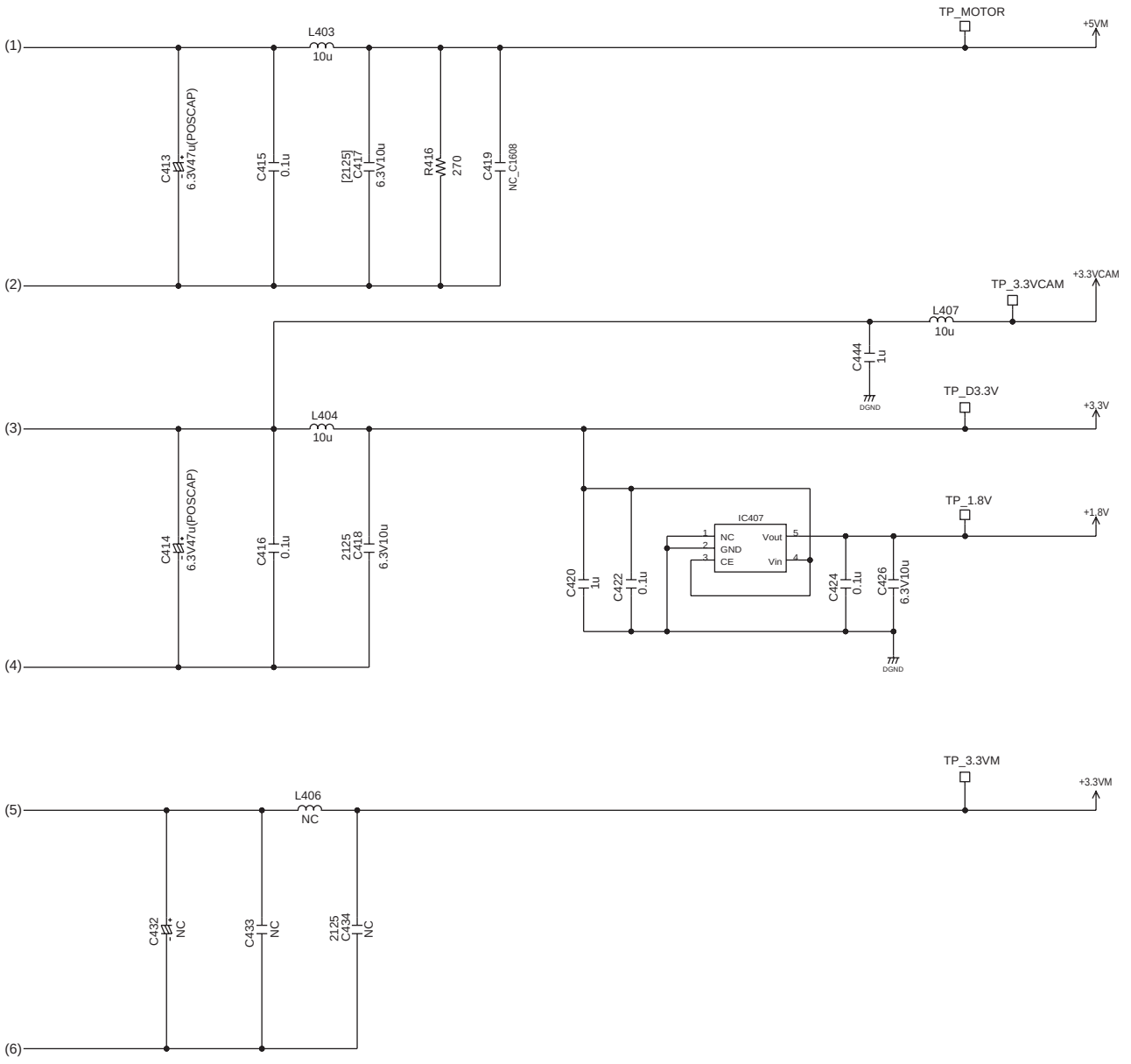
BB-HCM311 I/O BOARD (1/2)

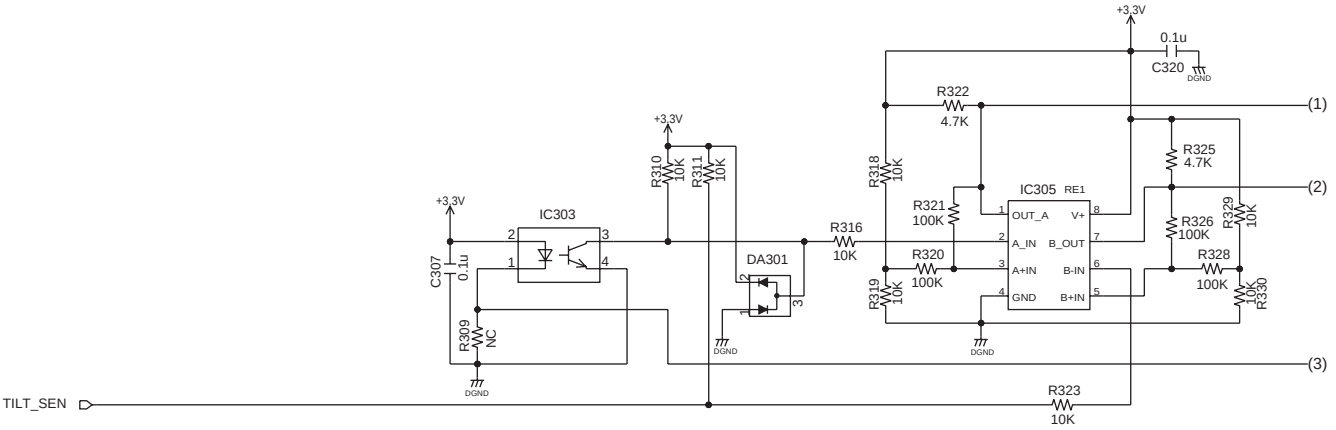

TP_LED3.3V
TP_+3.3V
+3.3V
L608
241
C620
10u
AG
CN606
C621
0.1u
IO_IN2
O_IN1
IO_OUT
LED_3.3V
R641
241
LED_R
LED_G
C641
10u
C622
0.1u
TXP
TXN
TX_CP
RXN
RXP
TP_IOGND1
TP_IOGND2
AG
DG
+A3.3V
IC602
Vcc
Output
GND
DET
Input
C625
0.1u
R625
20k
R627
10k
C627
1200p
C629
1u
10p
C646
R623
1M
C623
6.3V10u
TP_BIMICAMP1
AG
R614
150k
C615
330p
C618
0.47u
R621
3.3k
TP_BIMICAMP2
K
L
TP_EXMICAMP1
R617
150k
C617
330p
C619
0.47u
R622
3.3k
TP_EXMICAMP2
N
O
C614
1u
IC603
C626
0.1u
R626
20k
R628
10k
C628
1200p
10p
C648
R624
1M
C624
6.3V10u
SA606
SA607

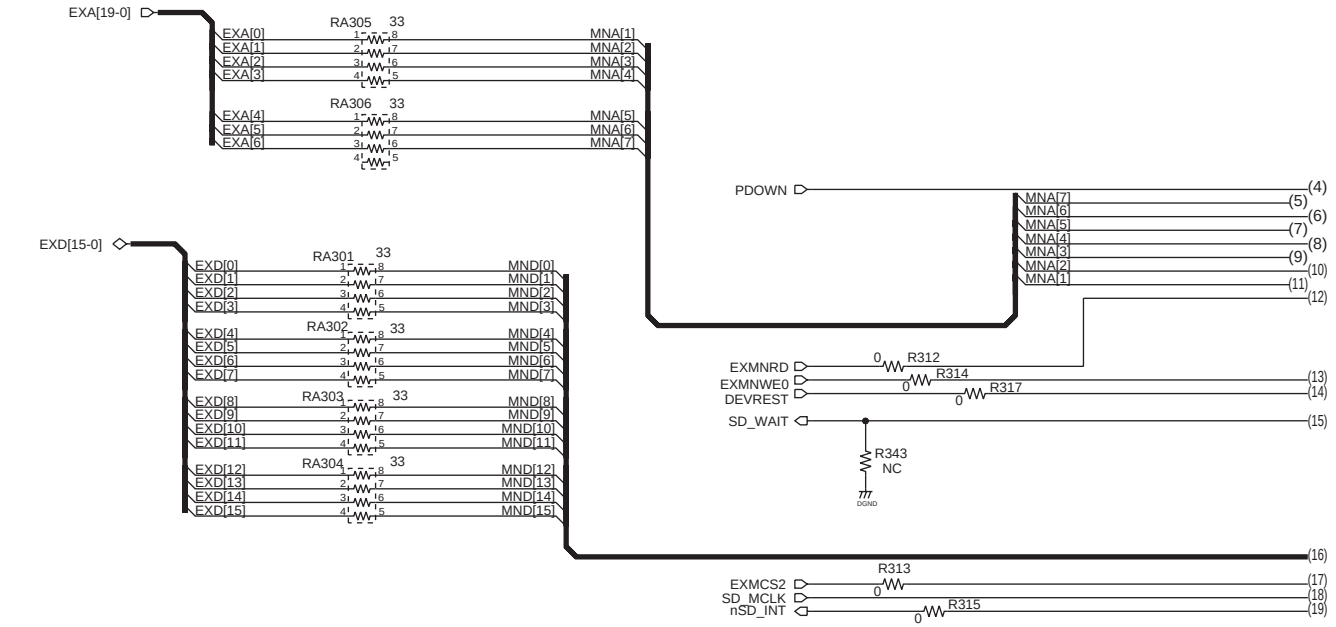

CN501
+3.3V
L501 10u
C503 0.1u
DGND
R531 47 CSN
R533 47 SCLK
R536 47 DATA
R538 47 SOUT
R502 47 DCLK
R503 47 SIN
R504 47 FCLK
R505 47 MIC_S
TP_12V
+12V_IN
R541 NC
R542 NC
R543 NC
C547 NC_C1608
C548 NC_C1608
C549 C1608
C550 NC_C1608
C505 NC_C1608
C509 NC_C1608
C515 NC_C1608
C521 NC_C1608
C529 NC_C1608
Q504
C545 0.1u
R530 10K
C546 0.1u
nSENSOR1
Q503
C543 0.1u
R529 10K
C544 0.1u
nSENSOR2
R506 47
R507 47
R508 47
R509 47 LED_R
R510 47 LED_G
C501 0.1u
C513 NC_C1608
C519 NC_C1608
C526 NC_C1608
C530 NC_C1608
C532 NC_C1608
Q501
R518 100
RELAY
C540 1000p
R511 0 TXP
R512 0 TXN
R513 0 TX_CP
R514 0 RXN
R515 0 RXP
C514 NC_C1608
C520 NC_C1608
C527 NC_C1608
C531 NC_C1608
C533 NC_C1608
R532 0 CCD_TILT[0]
R534 0 CCD_TILT[1]
R535 0 CCD_TILT[2]
R537 0 CCD_TILT[3]
CCD_TILT[3-0]
C506 220
C510 220
C516 220
C522 220
+3.3VCAM
R516 47
PHO_STOP
C523 NC_C1608
C502 [2125] 10u
C504 0.1u
R520 560 DEVREST
R521 560 PDOWN
R522 47 SCL
R523 47 SDA
L502 241 CAMCLK
R525 47 VSYNC
R526 47 HSYNC
601
YUV[0]
YUV[1]
YUV[2]
YUV[3]
RA502
C507 NC_C1608
C511 NC_C1608
C517 NC_C1608
C524 NC_C1608
R540 3.3k
R539 3.3k
C536 NC_C1608
C537 NC_C1608
C538 NC_C1608
C539 NC_C1608
C541 NC_C1608
YUV[7-0]
RA503
601
YUV[4]
YUV[5]
YUV[6]
YUV[7]
TILT_SEN
R501 47
C508 NC_C1608
C512 NC_C1608
C518 NC_C1608
C525 NC_C1608
C528 NC_C1608
CN502

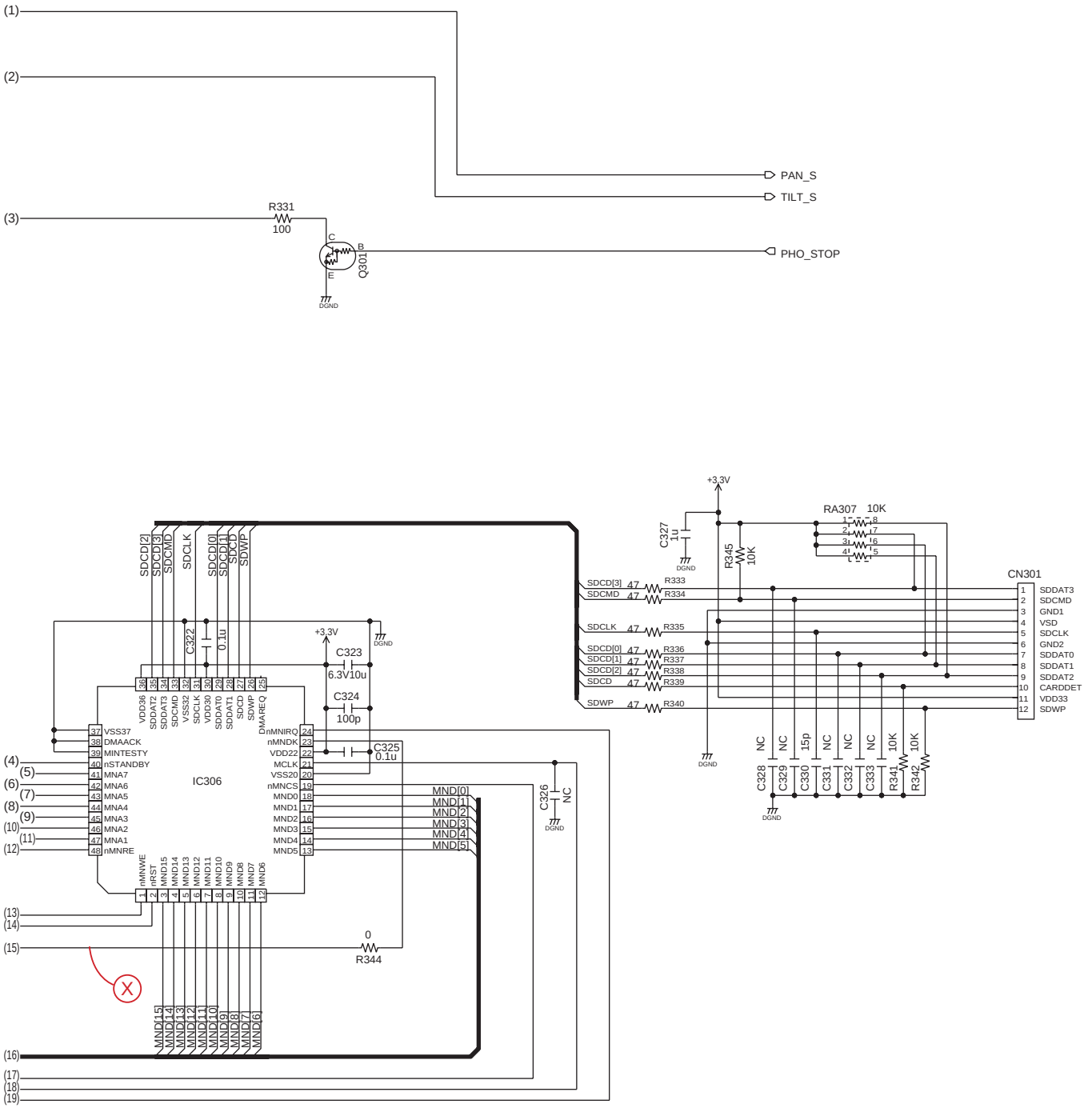


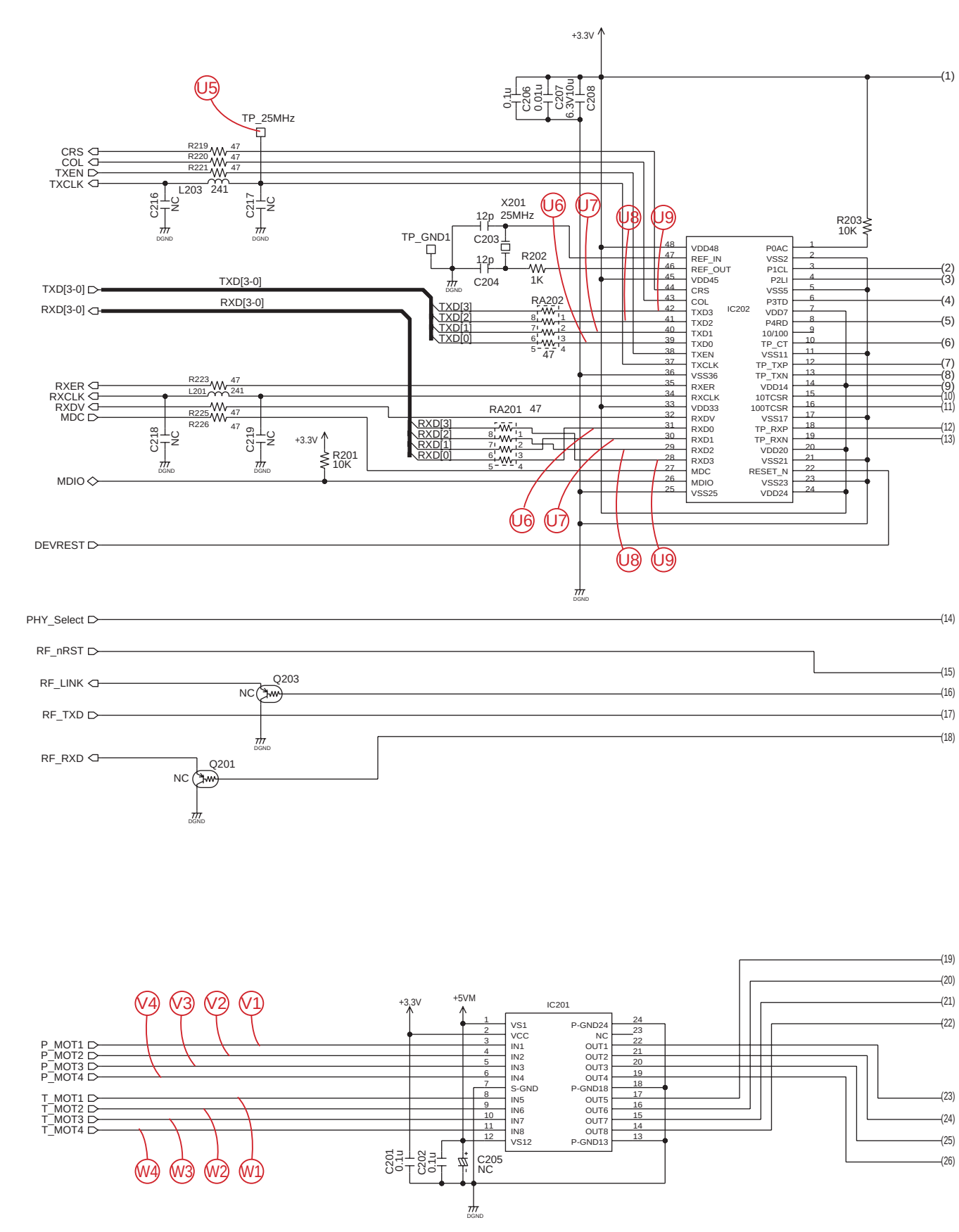
BB-HCM311 MAIN BOARD No.4 (1/2)


TP_MOTOR
+5VM
L403
10u
C413
6.3V47u(POSCAP)
C415
0.1u
[2125]
C417
6.3V10u
R416
270
C419
NC_C1608
TP_3.3VCAM
+3.3VCAM
L407
10u
C444
1u
DGND
TP_D3.3V
+3.3V
L404
10u
C414
6.3V47u(POSCAP)
C416
0.1u
2125
C418
6.3V10u
IC407
1 NC
2 GND
3 CE
5 Vout
4 Vin
TP_1.8V
+1.8V
C420
1u
C422
0.1u
C424
0.1u
C426
6.3V10u
DGND
TP_3.3VM
+3.3VM
L406
NC
C432
NC
C433
NC
2125
C434
NC
(1)
(2)
(3)
(4)
(5)
(6)

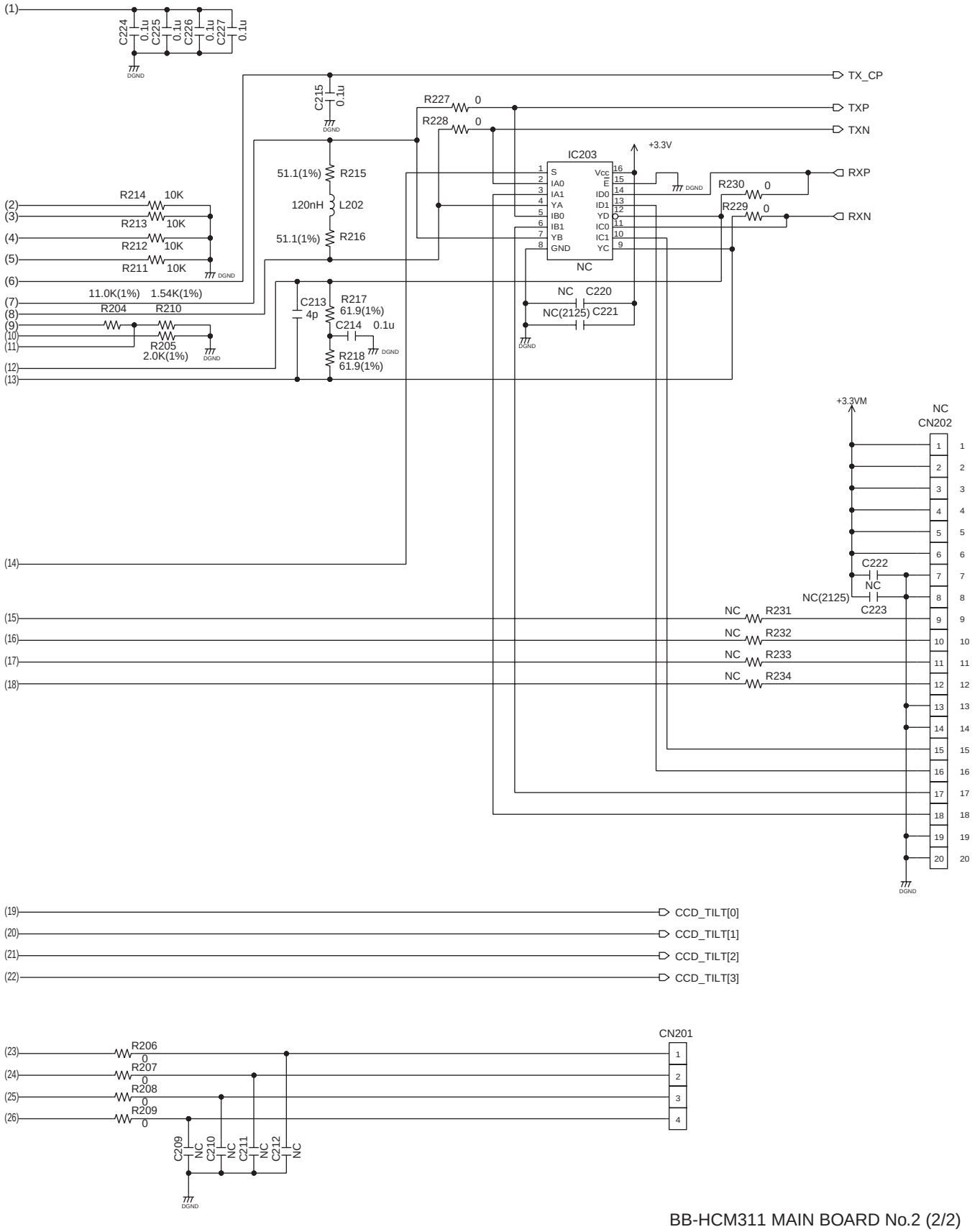

+3.3V
0.1u
C320
DGND
R322
4.7K
(1)
(2)
(3)
R325
4.7K
IC305
RE1
OUT_A
V+
A_IN
B_OUT
A+IN
B-IN
GND
B+IN
R321
100K
R320
100K
R319
10K
R318
10K
R326
100K
R328
100K
R329
10K
R330
10K
+3.3V
R310
10K
R311
10K
IC303
C307
0.1u
R309
NC
DA301
R316
10K
TILT_SEN
R323
10K


EXA[19-0]
RA305
33
EXA[0]
EXA[1]
EXA[2]
EXA[3]
MNA[1]
MNA[2]
MNA[3]
MNA[4]
RA306
33
EXA[4]
EXA[5]
EXA[6]
MNA[5]
MNA[6]
MNA[7]
PDOWN
(4)
(5)
(6)
(7)
(8)
(9)
(10)
(11)
(12)
EXD[15-0]
RA301
33
EXD[0]
EXD[1]
EXD[2]
EXD[3]
MND[0]
MND[1]
MND[2]
MND[3]
RA302
33
EXD[4]
EXD[5]
EXD[6]
EXD[7]
MND[4]
MND[5]
MND[6]
MND[7]
RA303
33
EXD[8]
EXD[9]
EXD[10]
EXD[11]
MND[8]
MND[9]
MND[10]
MND[11]
RA304
33
EXD[12]
EXD[13]
EXD[14]
EXD[15]
MND[12]
MND[13]
MND[14]
MND[15]
R312
0
EXMNRD
R314
0
EXMNWE0
R317
0
DEVREST
(13)
(14)
SD_WAIT
(15)
R343
NC
(16)
R313
0
EXMCS2
SD_MCLK
R315
0
nSD_INT
(17)
(18)
(19)

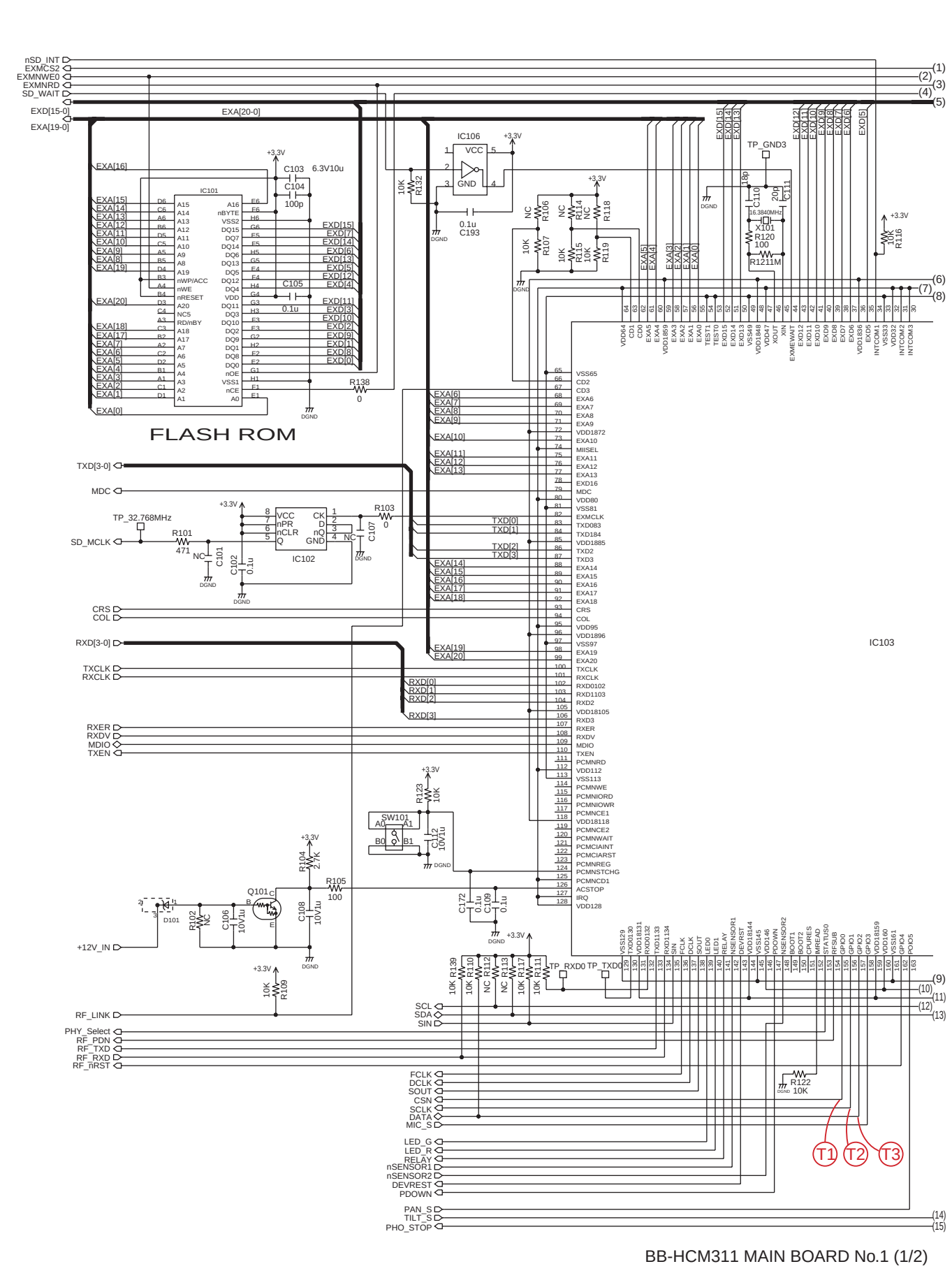

(1)
(2)
(3)
PAN_S
TILT_S
PHO_STOP
R331
100
Q301
DGND
IC306
CN301
SDCD[2]
SDCD[3]
SDCMD
SDCLK
SDCD[0]
SDCD[1]
SDCD
SDWP
C322
0.1u
C323
6.3V10u
C324
100p
C325
0.1u
C326
NC
C327
1u
R345
10K
RA307 10K
R333
R334
R335
R336
R337
R338
R339
R340
R341
R342
R344
C328
C329
C330
15p
C331
C332
C333
SDDAT3
SDCMD
GND1
VSD
SDCLK
GND2
SDDAT0
SDDAT1
SDDAT2
CARDDET
VDD33
SDWP
MND[0]
MND[1]
MND[2]
MND[3]
MND[4]
MND[5]
MND[6]
MND[7]
MND[8]
MND[9]
MND[10]
MND[11]
MND[12]
MND[13]
MND[14]
MND[15]



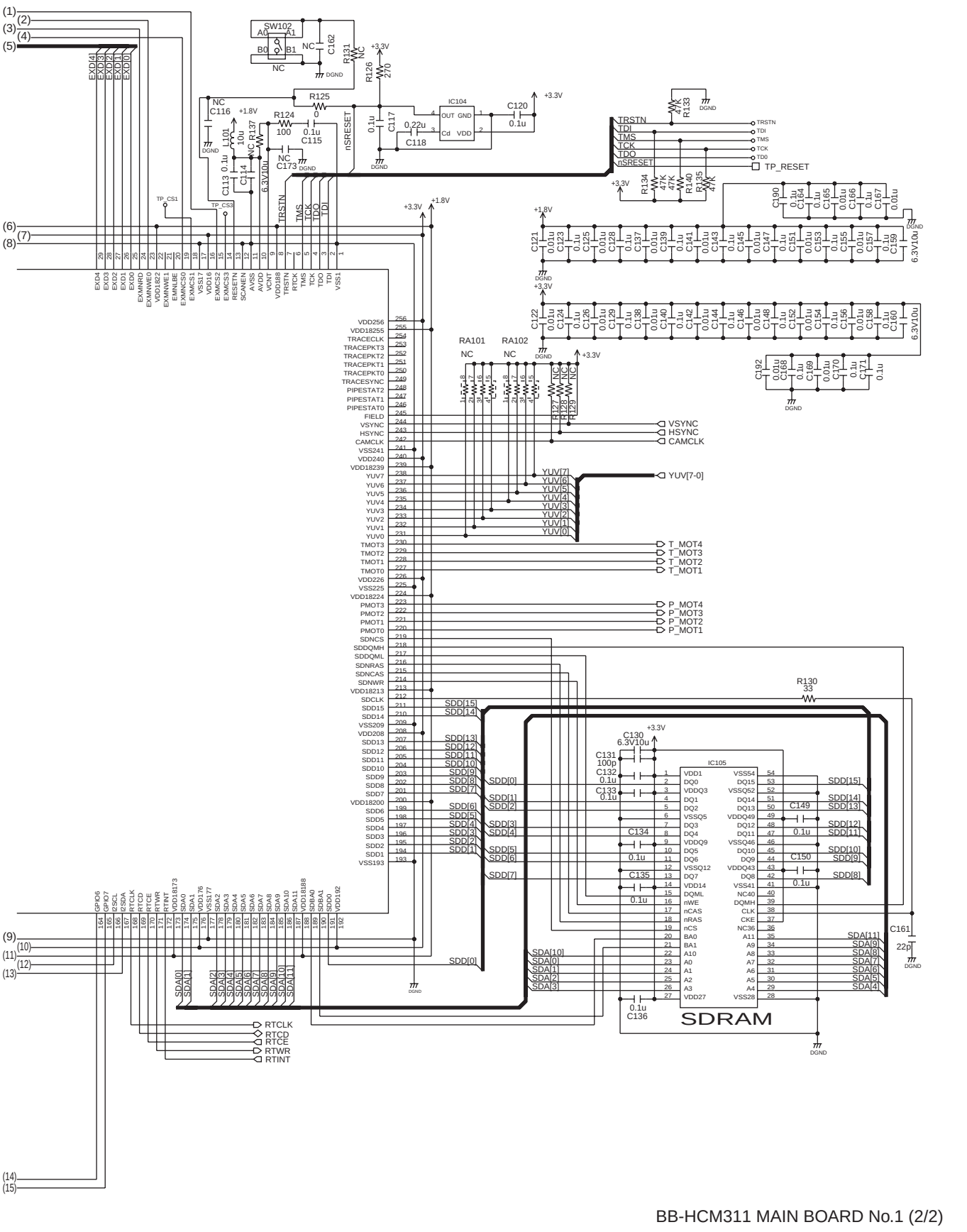
BB-HCM311 MAIN BOARD No.2 (1/2)



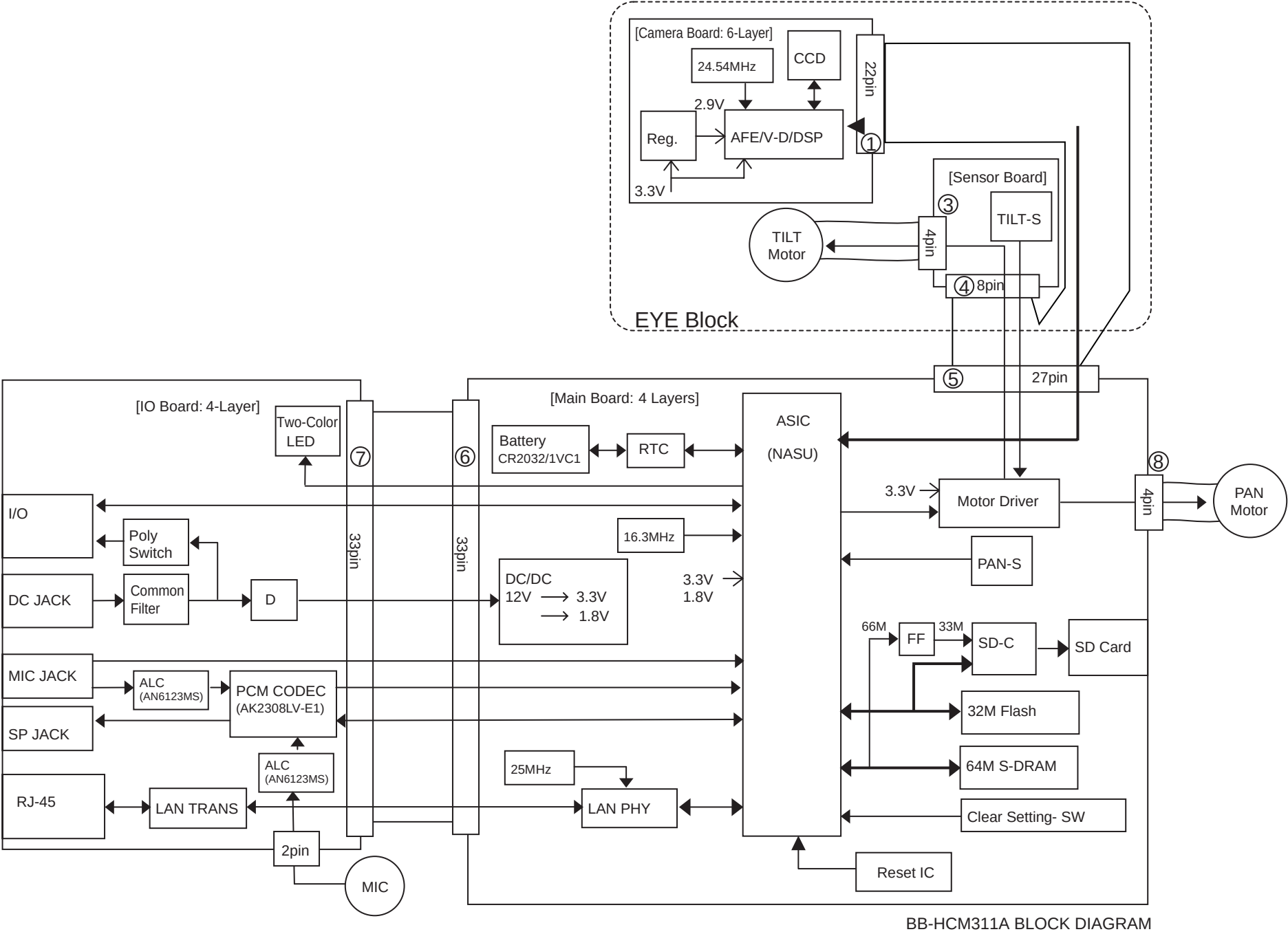
BB-HCM311 MAIN BOARD No.2 (2/2)



BB-HCM311 MAIN BOARD No.1 (1/2)



BB-HCM311 MAIN BOARD No.1 (2/2)



BB-HCM311A BLOCK DIAGRAM